ORDER NO. KM49610097A1
F1

Service Manual

and Technical Guide

Telephone Equipment

KX-TC157-B

(for U.S.A.)

Simplified

SOUND CHARGER PLUS

25 CHANNEL

ULTRA CHARGE

Cordless Phone

Please file and use this manual together with the Service Manual for Model KX-TC150-W order No. KM49607069C1 .
This Service Manual indicates the main differences between: Original KX-TC150-W and KX-TC157-B.

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians.
Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

■ PARTS COMPARISON TABLE (Change from original pages 61~67)

Ref. No.	Part No.		Part Name & Description	Pcs/ Set	Remarks
	KX-TC150-W	**KX-TC157-B**			
Base Unit					
1	PQKM10206R3	**PQKM10206P4**	Upper Cabinet	1	
2	PQKF10147M1	**PQKF10147N2**	Lower Cabinet	1	
4	PQBC10191Z1	**PQBC10191Z2**	Button, Handset Locator	1	
7	PQKE46Y21	**PQKE46Y3**	Hanger	1	
11	------	**PQGT12698Z**	Name Plate	1	Addition
12	------	**PQQT11261Z**	AC Adaptor	1	Addition
PCB1	PQWPTC100WH	**PQWPTC157BH**	P.C.Board Ass'y (RTL)	1	
Q17	------	**2SD1991**	Transistor (Si)	1	Addition
DB	------	**1SS120**	Diode (Si)	1	Addition
R149	------	**ERJ3GEYJ102**	Resistor, 1kΩ	1	Addition
R150	------	**ERDS2TJ101**	Resistor, 10Ω	1	Addition
R565	------	**ERDS2TJ101**	Resistor, 10Ω	1	Addition
J75	------	**ERJ3GEYJ000**	Resistor, 0Ω	1	Addition
Portable Handset					
100	PQKM10205W1	**PQKM10205W2**	Front Cabinet	1	
101	PQKF10180Z1	**PQKF10146Z2**	Cabinet Cover	1	
102	PQSA10041Z	**PQSA10041Y**	Antenna	1	
104	PQSX10028W	**PQSX10028T**	Switch, Keyboard	1	
105	PQKK10055Z1	**PQKK10061Z2**	Battery Cover	1	
115	------	**PQGT12697Z**	Name Plate	1	Addition
PCB100	PQWPTC100WR	**PQWPTC157BR**	P.C.Board Ass'y (RTL)	1	
Q102	------	**2SD1819A**	Transistor (Si)	1	Addition

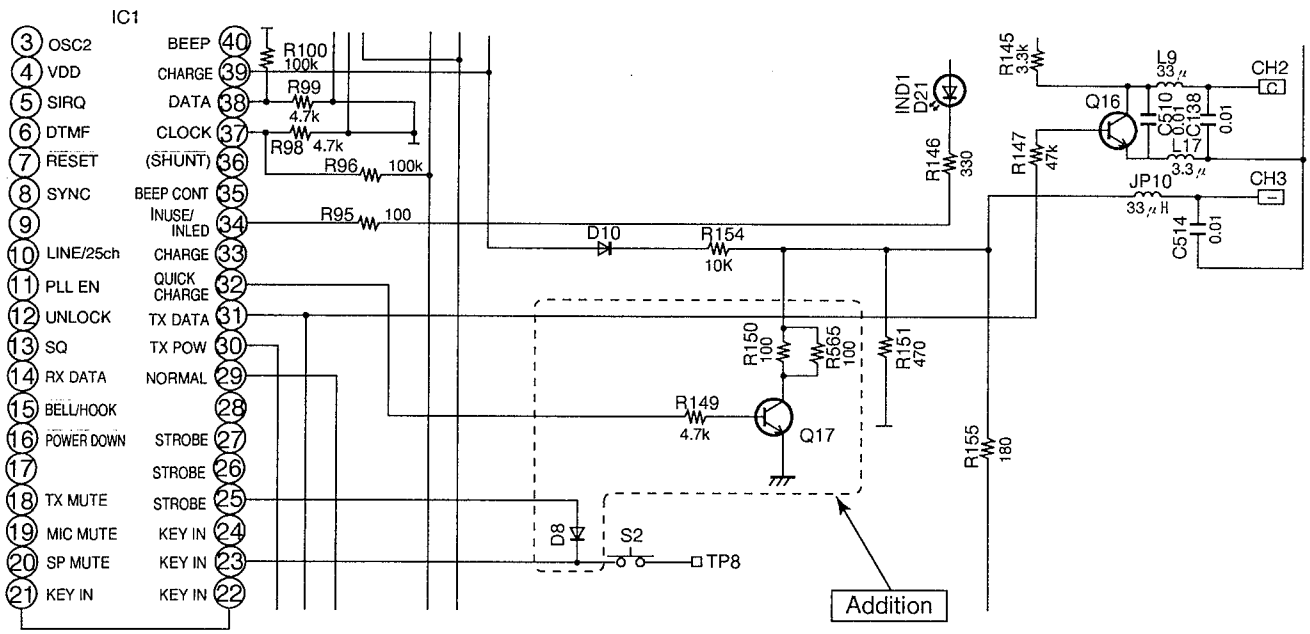
Panasonic

KX-TC157-B

■ PARTS COMPARISON TABLE (Change from original pages 61~67)

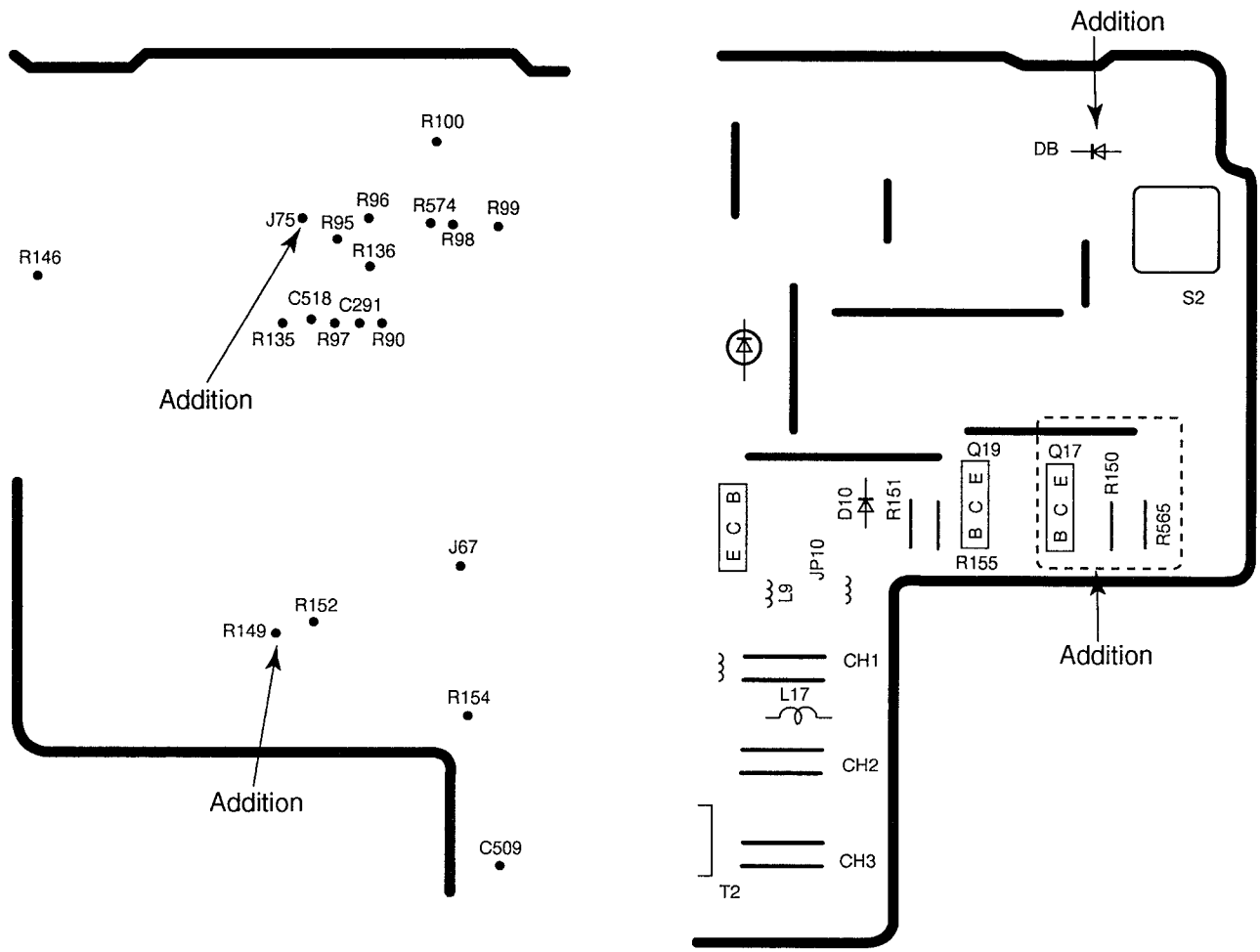
Ref. No.	Part No.		Part Name & Description	Pcs/ Set	Remarks
	KX-TC150-W	**KX-TC157-B**			
Portable Handset					
D101	——	**LN363GPPKU**	LED	1	Addition
D102	——	**LN363GPPKU**	LED	1	Addition
D103	——	**LN363GPPKU**	LED	1	Addition
D104	——	**LN363GPPKU**	LED	1	Addition
R112	——	**ERJ3GEYJ103**	Resistor, 10kΩ	1	Addition
R113	——	**ERJ3GEYJ151**	Resistor, 150Ω	1	Addition
R114	——	**ERJ3GEYJ151**	Resistor, 150Ω	1	Addition
C61	ECST0GX476	**ECST0GX686**	Capacitor, 68µF	1	
Accessories and Packing Material					
A3	PQQX11648Z	**PQQX11705Z**	Instruction Book	1	
A4	KX-A10	**KX-A11-5**	AC Adaptor	1	
A6	——	**PQQW11517Z**	Leaflet	1	Addition
P4	PQPK12165Z	**PQPK12250Z**	Gift Box	1	

■ SCHEMATIC DIAGRAM (KX-TC150H-W) [Change from original pages 17, 18]



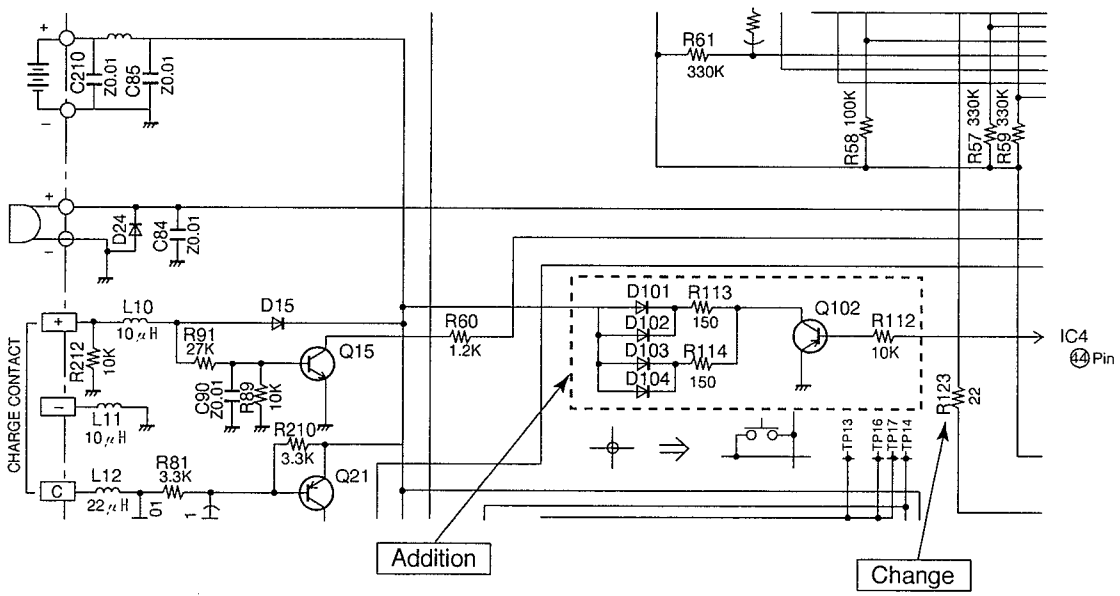
(Model KX-TC157-B)

■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM (KX-TC150H-W) [Change from original pages 13~16]



(Model KX-TC157-B)

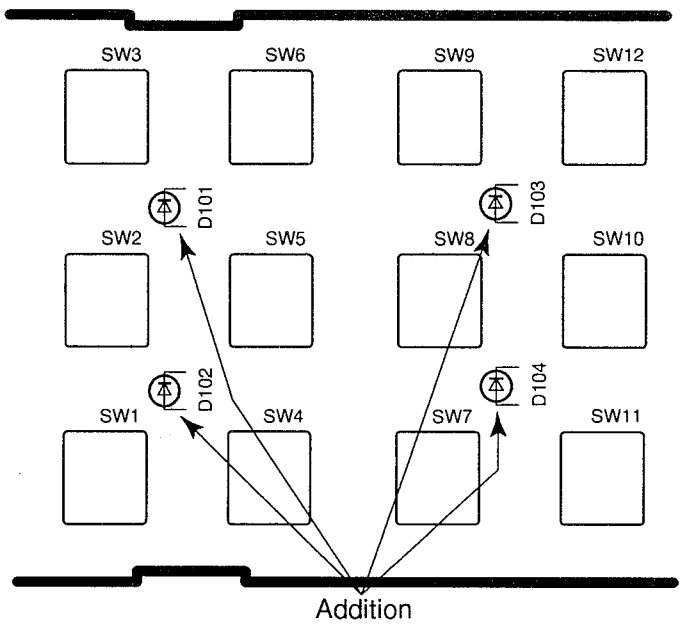
■ SCHEMATIC DIAGRAM (KX-TC150R-W) [Change from original pages 19, 20]

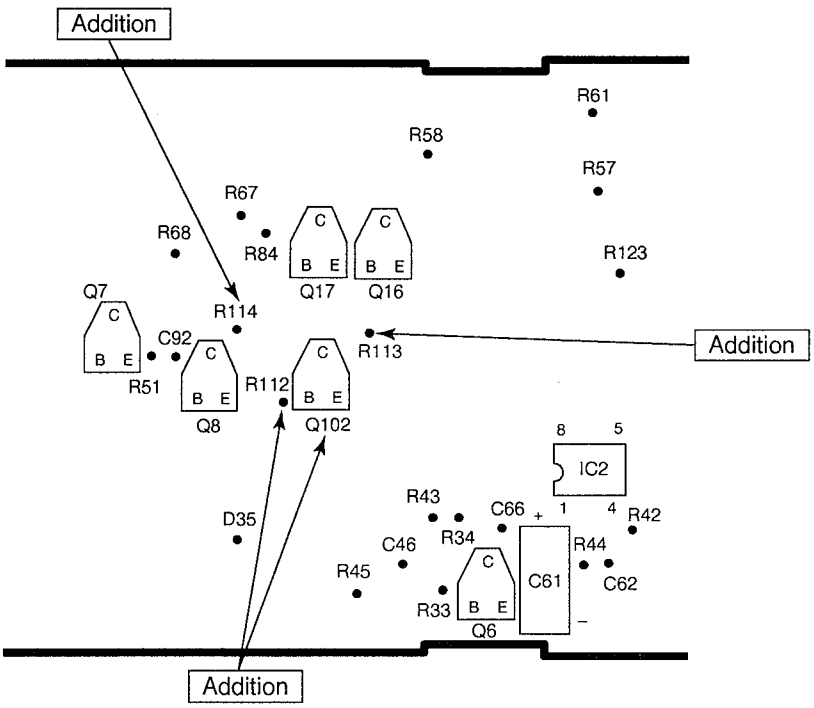


(Model KX-TC157-B)

KX-TC157-B

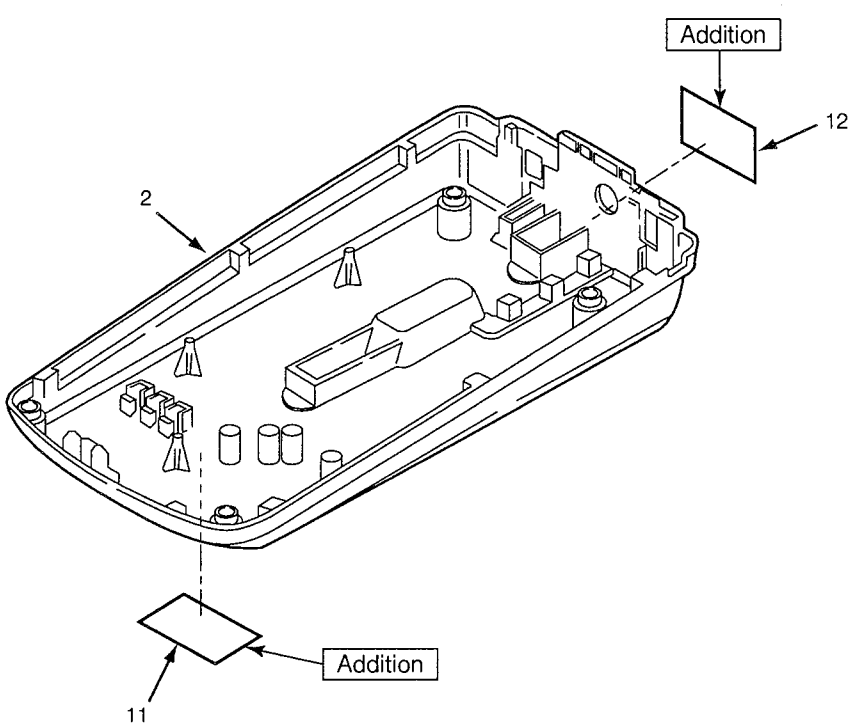
■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM (KX-TC150R-W) [Change from original pages 21~24]





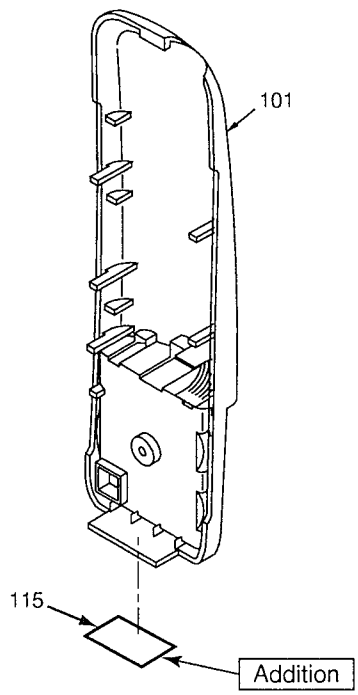
(Model KX-TC157-B)

■ CABINET AND ELECTRICAL PARTS LOCATION (KX-TC150H-W) [Change from original page 58]



(Model KX-TC157-B)

■ CABINET AND ELECTRICAL PARTS LOCATION (KX-TC150R-W) [Change from original page 59]



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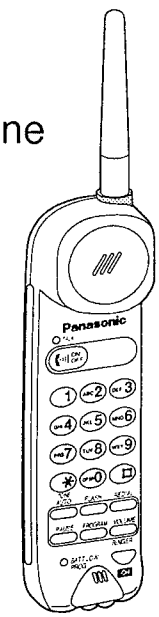
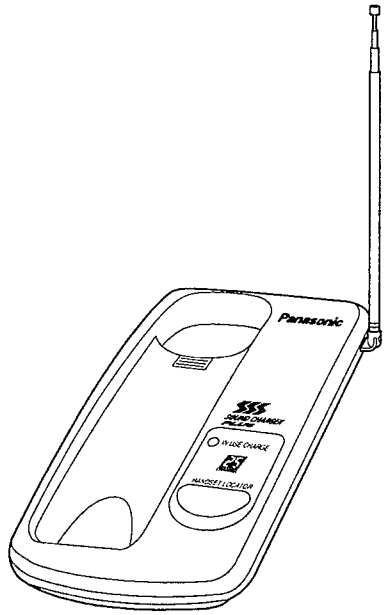
KX-TC150-W

(for U.S.A.)



(KX-TC150R-W)



(KX-TC150H-W)

■ SPECIFICATIONS

General

Modulation:	FM, 5 kHz Deviation	Pause:	3.5 seconds per pause
Frequency Stability:	±2.5 kHz	Memory Capacity:	10 telephone numbers, up to 16 digits per station
Dial Type:	Tone (DTMF)/Pulse		
Redial:	Last dialed number each time the Redial button is pressed		

	Base Unit (KX-TC150H-W)	Portable Handset (KX-TC150R-W)
Power Source:	AC adaptor KX-A10 (DC 12 V)	Built-in rechargeable Ni-Cd battery (PQXA36ASVC)
(Receiver Section)		
Receiving Frequency:	25 channels within 48.76 to 49.97 MHz	25 channels within 43.72 to 46.97 MHz
Adjacent Channel Rejection:	40 dB	40 dB
Sensitivity:	1dBμV for 20 dB S/N	2 dBμV for 20 dB S/N
(Transmitter Section)		
Transmitting Frequency:	25 channels within 43.72 to 46.97 MHz	25 channels within 48.76 to 49.97 MHz
Jacks:	DC IN, Telephone line	
Antenna:	Telescopic	Rubber Flexible
Speaker:	2" (5 cm) PM dynamic	$1^{3}/_{16}$" (3 cm) dynamic
Microphone:	Condenser microphone	Condenser microphone
Dimensions (H×W×D):	2"×4 $^{3}/_{4}$"×$8^{25}/_{32}$" (51×121×223 mm)	$11^{1}/_{16}$"×2"×$1^{15}/_{16}$" (281×51×49 mm)
Weight:	0.66 lbs. (300 g)	0.46 lbs. (210g) with battery

Design and specifications are subject to change without notice.

Panasonic

KX-TC150-W

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Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

When you mention the serial number, write down all 11 digits. The serial number may be found on the label affixed to the bottom of the unit.

FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.
When repairing, the following precautions will help prevent recurring malfunctions.
1. Cover plastic parts boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on worktable.
4. Do not grasp IC or LSI pins with bare fingers.

CAUTION

**Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended
by the manufacturer. Dispose of used batteries according
to the manufacture's instructions.**

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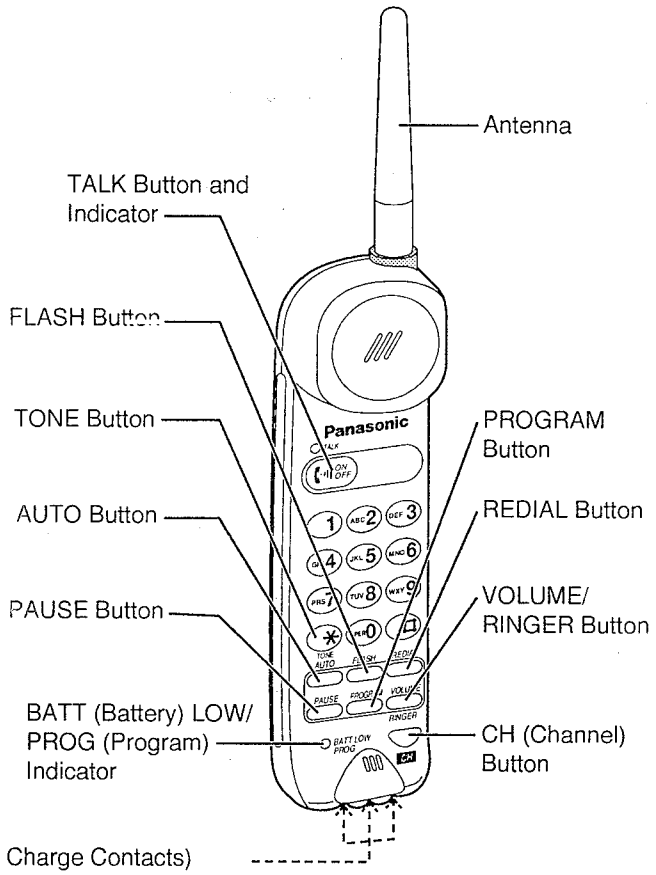
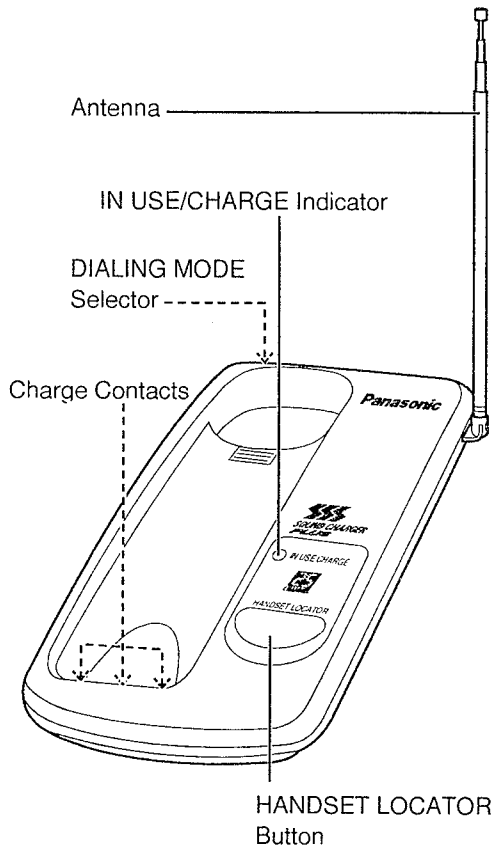
LOCATION OF CONTROLS

Portable Handset (KX-TC150R-W)



Base Unit (KX-TC150H-W)



STANDARD BATTERY LIFE

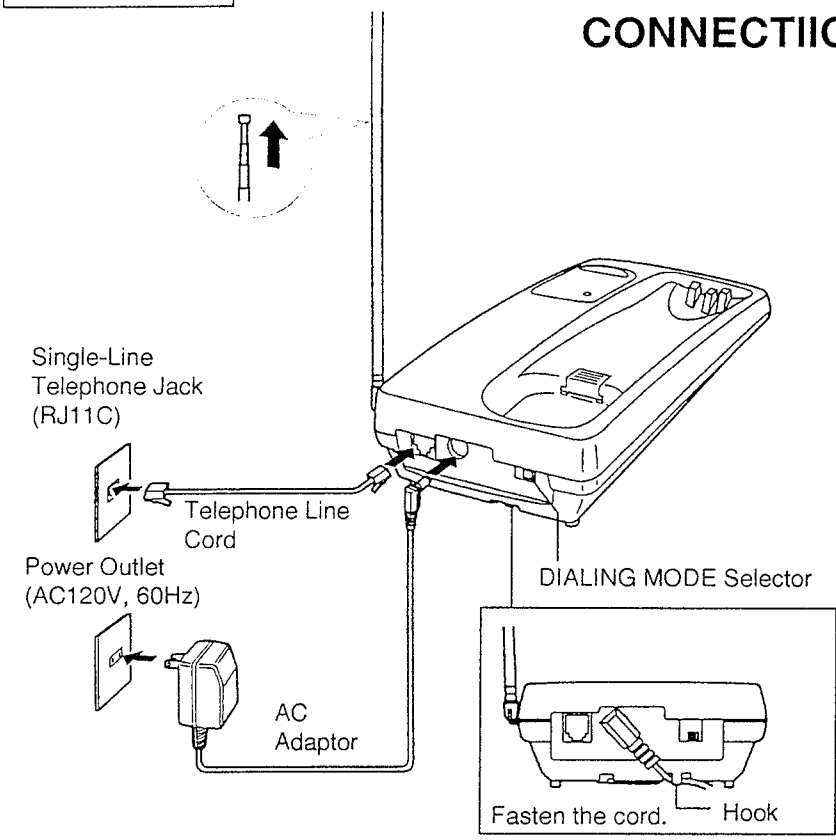
If your Panasonic battery is fully charged;

While in use (TALK)	Up to about 8 hours
While not in use (Stand-by)	Up to about 30 days

- Battery life may vary depending on usage conditions and ambient temperature.
- The battery cannot be overcharged.
- Clean the charge contacts with a soft cloth once a month, or the battery may not charge properly.
- Once the battery is fully charged, you do not have to place the handset on the base unit until the BATT LOW/PROG indicator flashes.

KX-TC150-W

CONNECTIION



This connection is for U.S.A. version only.

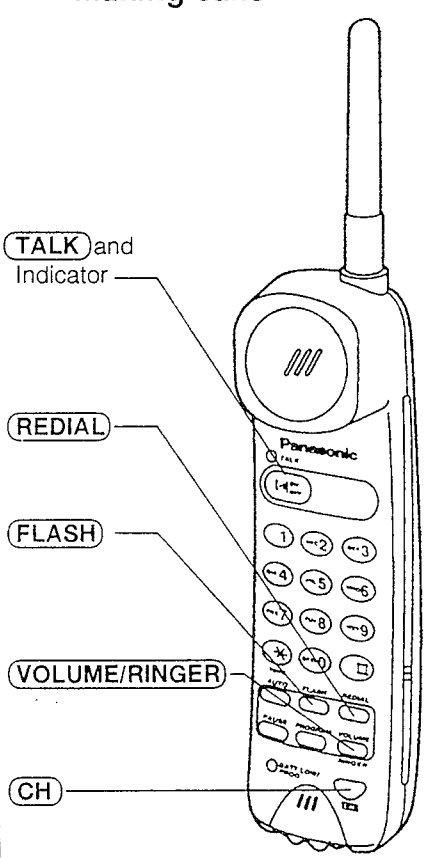
Refer to the simplified manual (cover) for Canada or other areas.

- USE ONLY Panasonic AC ADAPTOR KX-A10.
- The AC adaptor must remain connected at all times. (It may feel warm during use. This is normal.)

OPERATIONS

NEW OPERATIONS

Making calls



1 Press (TALK)

- The indicator lights.
- If alarm tone sounds.

2 Dial a telephone number.

3 To hang up, press (TALK) or place the handset on the base unit.

- The indicator light goes out.

STOP

OPERATING DISTANCE

To maximize the distance of the handset from the base unit.

If you misdial

Press (FLASH) firmly. → Dial again.

To redial the last number

press (TALK) → (REDIAL) .

To select the receiver volume HIGH or NORMAL (preset)

press (VOLUME/RINGER) while speaking.

- Each time you press, the volume level will change.

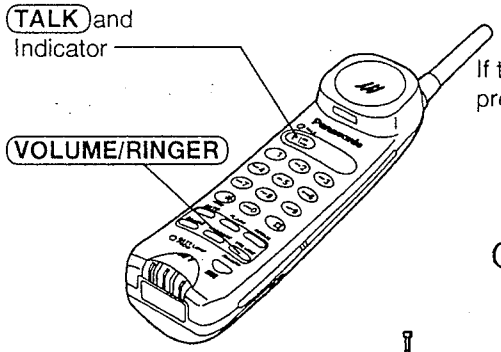
If noise interferes with the conversation

New

Press (CH) to select a clear one of 25 channels or move closer to the base unit.

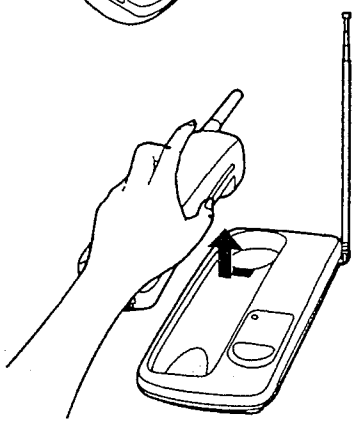
NORMAL OPERATIONS

Answering Calls



If the handset is off the base unit, press TALK.

OR



If on the base unit, just lift it.

Any Key Talk

You can also answer a call by pressing any dialing button (0 to 9, ✱, #).

To select the ringer volume HIGH (preset) or LOW

Be sure the TALK indicator light is off.→ press VOLUME/RINGER.
- Each time you press, the bell sounds and the ringer volume will change.

To turn the ringer OFF

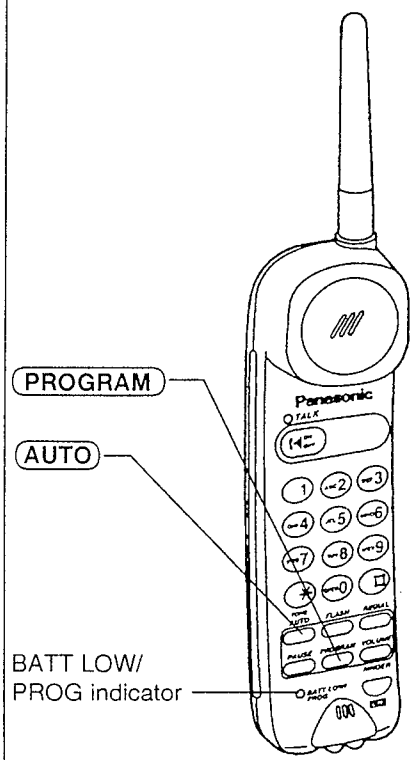
Be sure the TALK indicator light is off.→ While pressing VOLUME/RINGER, press 0 until 2 beeps sound.

To change the ringer to ON from OFF

Be sure the TALK indicator light is off.→ press VOLUME/RINGER.
- The ringer sounds at the HIGH level.

Storing Phone Numbers in Memory

The diaring buttons (0 to 9) function as memory stations.
The TALK indicator light must be off.



1 Press PROGRAM.
- The BATT LOW/PROG indicator lights.

2 Enter a phone number up to 16 digits.

3 Press AUTO.

4 Press a memory station number (0 to 9).
- Confirmation tone sounds. (See right side.)
- To store other numbers, repeat steps 1 through 4.

If you misdial

press PROGRAM to end storing.
→Restart from step 1.

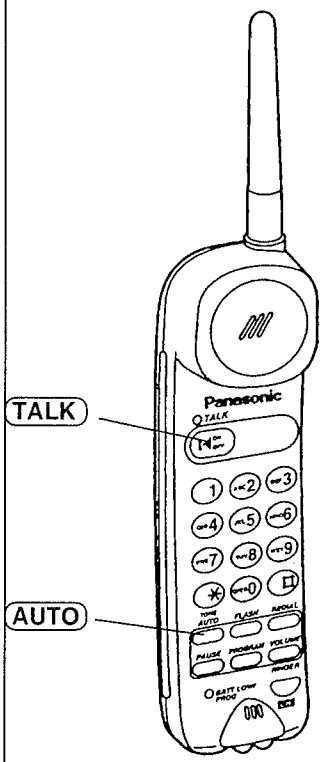
To erase a stored number

press PROGRAM → AUTO → the memory station number (for the phone number to be erased).

What the confirmation tone means

1 beep: The number is newly stored.
2 beeps: The number is same as previously stored one.

Dialing a Stored Number



1 Press (TALK).

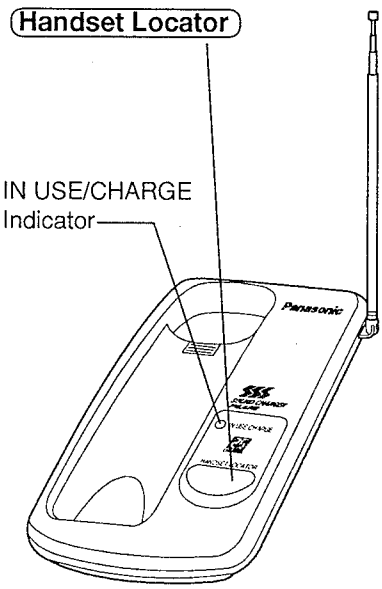
2 Press (AUTO).

3 Press a memory station number (0 to 9).

- The stored number is dialed.

Handset Locator

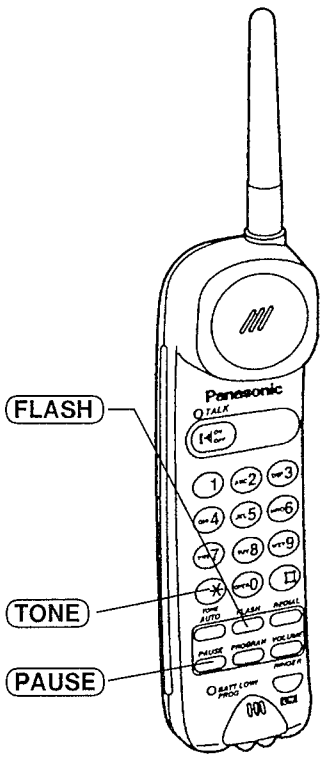
You can locate the handset or page aperson at the handset with beep tones.



Press (HANDSET LOCATOR).

- The handset beeps for 1 minute.
- The IN USE/CHARGE indicator flashes.

- To stop paging, press (HANDSET LOCATOR) again or press (TALK) on the handset twice.



Automatic Security Code Setting

Whenever you place the handset on the base unit, the unit automatically selects one of 65,000 security codes. These codes help to avoid unauthorized use of your telephone line by another cordless telephone.

For Call Waiting Service Users

Press (FLASH) lightly if you hear a call-waiting tone while speaking.
- The first call is put on hold and you can answer the second call.
- To return to the first caller, press (FLASH) again.

Temporary Tone Dialing (For Rotary Service Users)

Press (TONE) before dialing.
- The dialing mode changes to tone. You can enter numbers to access the answering system or electronic banking services, etc. When you hang up, the mode returns to pulse.

If your Unit is Connected to a PBX

We recommend you press (PAUSE) between the access number for an outside line and the phone number.

Pressing (PAUSE) once makes a 3.5-second pause and prevents misdialing when you redial or dial a stored number.

DISASSEMBLY INSTRUCTIONS

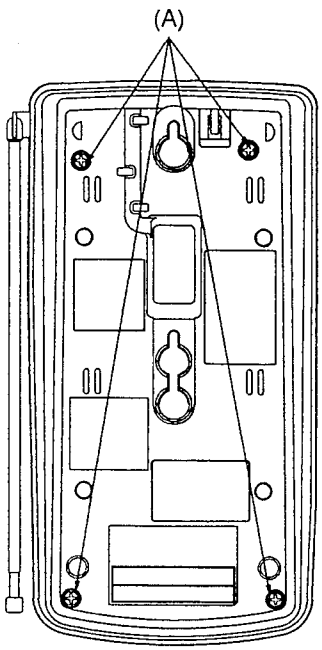


Fig. 1

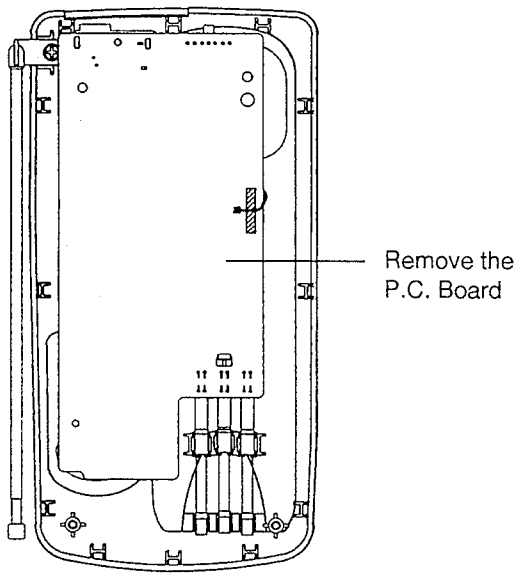


Fig. 2

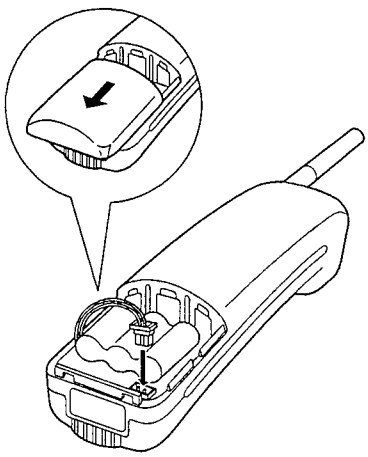


Fig. 3

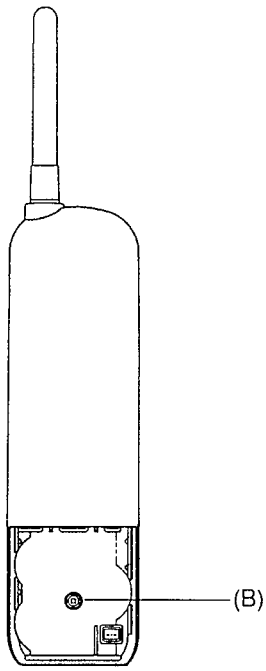


Fig. 4

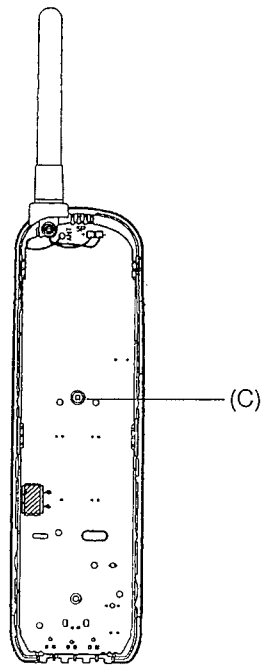
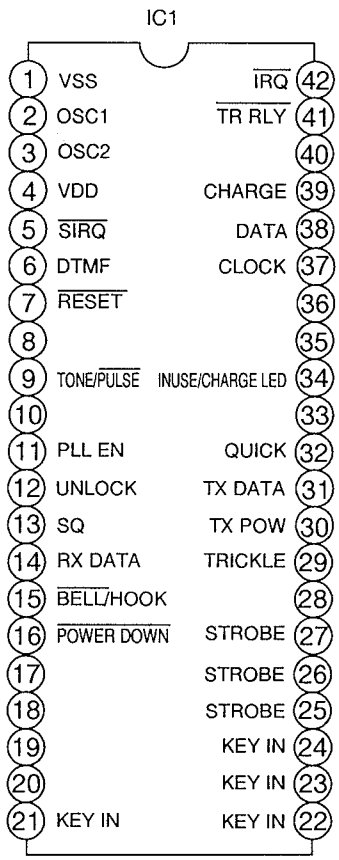


Fig. 5

Ref. No.	Procedure	Shown in Fig.—	To remove—.	Remove—.
1	1	1	Lower Cabinet	Screws (3×14) ..... (A)×4
2	1, 2	2	Printed Circuit Board	Remove the P.C. Board
3	3, 4	3	Rear Cabinet	Remove the battery compartment cover
4		4		Screw (2.6×12) ..... (B)×1
5	3~5	5	Printed Circuit Board	Screw (2.6×10) ..... (C)×1

CPU DATA (KX-TC150H-W)

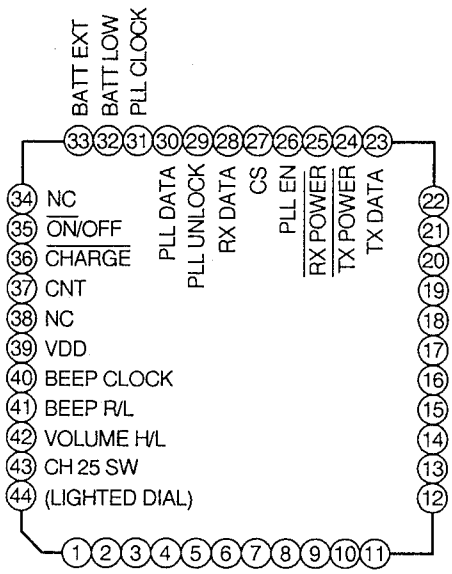


IC1 MN150409KRG1

Pin No.	Description	I/O	High	High-Z	Low	Pin No.	Description	I/O	High	High-Z	Low
1	GND				GND	25	Option Strobe	O		Normal	Active
2	CPU Clock	I				26	Option Strobe	O		Normal	Active
3	(3.573MHz)	O				27	Option Strobe	O		Normal	Active
4	VDD					28	Not Used				
5	Ext. Interrupt Input	I	Normal			29	Charge Current	O	Trickle		Normal
6	DTMF	O	(Active)	Normal	(Active)	30	TX POWER	O	ON		OFF
7	$\overline{\text{Reset}}$	I	Normal		Reset	31	TX DATA	O	1		0
8	Not Used					32	Not Used				
9	TONE/$\overline{\text{PULSE}}$ SW	I	TONE		PULSE	33	Not Used				
10	25CH Switch	O	from CH1 to CH15		from CH16 to CH25	34	IN USE/CHARGE LED	O		OFF	ON
11	PLL EN	O	Active		Normal	35	Not Used				
12	PLL Unlock	I	Unlock		Lock	36	Not Used				
13	SQUELCH	I	Electric Feild Low		Electric Feild High	37	Serial Clock	O	Normal		(Active)
14	RX DATA	I	1		0	38	Serial Data	O	(Active)		(Active)
15	$\overline{\text{Bell}}$/(Hook)	I	Off Hook		Bell in	39	Charge	I	Charge		Non
16	$\overline{\text{Power Down}}$	I	Normal		Down	40	Not Used				
17	Not Used					41	$\overline{\text{TR-RLY}}$	O		OFF	ON
18	Not Used					42	Ext. Interrupt Input	I	Normal		
19	Not Used										
20	Not Used										
21	Key in	I/O	Normal		Key in						
22	Key in	I/O	Normal		Key in						
23	Key in	I/O	Normal		Key in						
24	Key in	I/O	Normal		Key in						

CPU DATA (KX-TC150R-W)

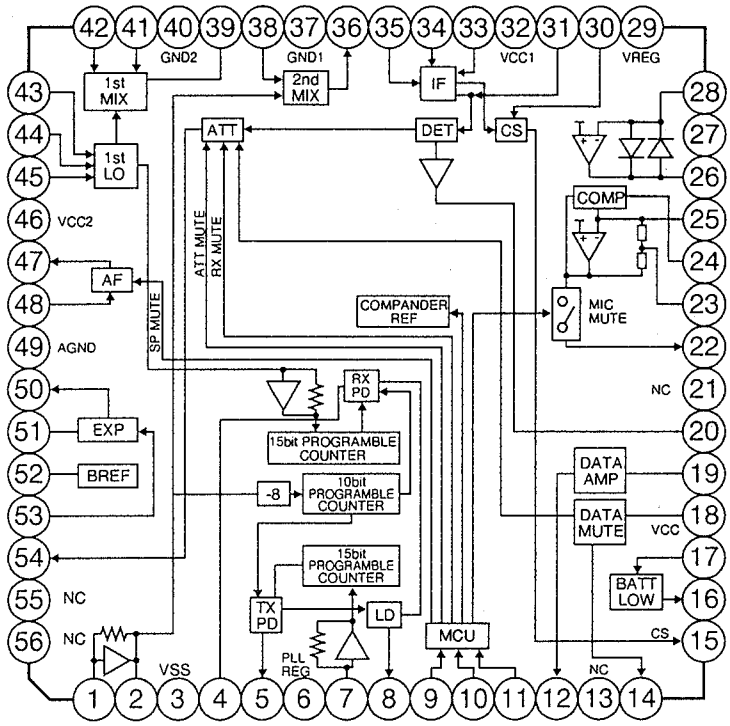
IC4 PQVI0006G509



Pin No.	Description	I/O	High	High-Z	Low	Pin No.	Description	I/O	High	High-Z	Low
1	Option Strobe 1	O	Normal		Active	25	$\overline{\text{RX Power}}$	O	Off		On
2	Option Strobe 0	O	Normal		Active	26	PLL En	O	Latch		Normal
3	Key Strobe 4	O	Normal		Active	27	Squelch	I	Electric Field Low		Electric Field High
4	Key Strobe 3	O		Normal	Active	28	RX Data	I	(Data)		Normal
5	Key Strobe 2	O		Normal	Active	29	PLL Unlock	I	Unlock		Lock
6	Key Strobe 1	O		Normal	Active	30	PLL Data	O	(Data)		Normal
7	Key Strobe 0	O		Normal	Active	31	PLL Clock	O	(Clock)		Normal
8	Key In 3	I	Off		On	32	Batt Low	I	High		Low
9	Key In 2	I	Off		On	33	Battery	I	High		Low
10	Key In 1	I	Off		On	34	Not Used				
11	Key In 0	I	Off		On	35	$\overline{\text{On}}$/Off	I	Off		On
12	Not Used					36	$\overline{\text{Charge}}$ (Battery Terminal)	I	Normal		Charge
13	Not Used					37	$\overline{\text{Charge}}$ (Control)	I	Charger		Base Unit
14	LED (BATT LOW)	O		Off	On	38	Internally Conn.				
15	LED (TALK)	O		Off	On	39	VDD				
16	Not Used					40	Beep Clock	O	Normal		(Clock)
17	GND					41	Beep Control	O	Low		High
18	Sub Clock	I				42	RX Volume Selecter	O	Low		High
19	(32.768kHz)	I				43	CH25 Switch	O	From CH1 to CH15		From CH16 to CH25
20	$\overline{\text{Reset}}$	I	Normal		Reset	44	Not Used				
21	Main Clock	I									
22	(3.99MHz)	I									
23	TX Data	O	(Data)		Noraml						
24	$\overline{\text{TX Power}}$	O	Off		On						

KX-TC150-W

EXPLANATION OF IC TERMINALS



Part No. AN6185NFA
IC2: Base Unit
IC1: Portable Handset

Pin No.	Description		Pin No.	Description	
1	2Lo-IN	Second Oscillator Input	29	VREG	Baseband Regulater Output
2	2Lo-OUT	Second Oscillator Output	30	CS-HiCut	Carrier Sens. High Cut
3	VSS	GND for PLL	31	Quad	Quadrature Coil
4	RX-PD	RX Phase Comparison Output	32	VCC1	Vcc1
5	TX-PD	TX Phase Comparison Output	33	IF-PASS	IF Amp. Decuppling
6	PLL-REG	PLL Regulater Output	34	IF-IN	IF Amp. Input
7	fINT	TX Carrier Input	35	IF-PASS	IF Amp. Decuppling
8	LD	Lock Detector Output	36	2MIX-OUT	Second Mixer Input
9	DATA	Serial Data Input	37	GND1	GND1
10	EN	Enable Input	38	2MIX-IN	Varicap Control
11	CLK	Clock Input	39	1MIX-OUT	First Mixer Output
12	DATA-AMP OUT	Data Amp. Output	40	GND2	GND2
13	NC	Not Used	41	RF-IN	First Mixer Input
14	DATA-MUTE CONT	Data Mute Time Constant Adjustment	42	RF-IN	First Mixer Input
15	CS-OUT	Carrier Sensitivity Output	43	VA-CONT	Varicap Control
16	Batt-Lo	Battery Low LED Drive	44	1st-Lo	First Oscillator Tank
17	Batt-CONT	Battery Low Level Control	45	1st-Lo	First Oscillator Tank
18	DATA-MUTE IN	Data Mute Input	46	VCC2	VCC2
19	DATA-AMP IN	Data Amp. Input	47	AF-OUT	AF Amp. Output
20	IF-DET-OUT	IF-DET Output	48	AF-AMP IN	AF Amp. Input
21	NC	Not Used	49	AGND	Analog GND
22	COMP-OUT	COMP Output	50	EXP-OUT	Exp. Output
23	COMP-REF	COMP Output VREF	51	EXP-DET	Exp. Detect
24	C-DET	COMP Detect	52	BREF	Baseband VREF
25	COMP-IN	COMP Input	53	EXP-IN	Exp. Input
26	MIC-OUT	MIC Amp. Output	54	ATT-OUT	Attenuator Output
27	NC	Not Used	55	NC	Not Used
28	MIC-IN	MIC Amp. Input	56	NC	Not Used

ADJUSTMENTS (KX-TC150H-W)

If your unit have below symptoms, adjust each item using remedy column from the table.

Symptom	Remedy
The base unit dose not respond to a call from portable handset.	Make adjustments in item(A)
The base unit dose not transmit or the transmit frequency is off.	Make adjustments in item(B)
The transmit frequency is off.	Make adjustments in item(C)
The transmit power output is low, and the operating distance between base unit and portable handset is less than normal.	Make adjustments in item(D)
The reception sensitivity of base unit is low with noise.	Make adjustments in item(E)
The transmit level is large or small.	Make adjustments in item(F), (G)
The reception level is large or small.	Make adjustments in item(H)
The unit does not link.	Make adjustments in item(I)

Unit condltion:

Remove the antenna from P.C Board of the base unit.

How to set the test mode:

CH25 Test Mode

Set S1 to OFF(Power OFF)
↓
While pressing S21, set S1 to ON.
After pressing S1 for 1second,
set S21 to OFF(unit becomes
CH25 talk test mode).

- Every time pressing S22, unit changes as follow.
  Talk → Standby → Talk → Standby
- Every time pressing S21, unit changes as follow.
  CH25 → CH1 → CH2 → CH3.....CH24 → CH25
- When setting S1 to OFF, unit releases from test mode.

When replacing these parts, adjust as shown in table below table.

Replace Parts	Adjustment items	Test Mode	Adjustment Point	Procedure
IC2, T3	(A) RX VCO Adjustment	CH25 Talk	T3	1. Set S1, S5 to ON. 2. Adjust T3 so that the reading of the Digital Voltmeter is 2.0V±0.2 V (After adjusting, set S5 to OFF).
D1 ,D2, T5	(B) TX VCO Adjustment	CH25 Talk	T5	1. Set S1, S4 to ON. 2. Adjust T5 so that the reading of the Digital Voltmeter is 2.2 V±0.2 V (After adjusting, set S4 to OFF).
DUP1, T2, TC1, X2	(C) TX Frequency Adjustment	CH25 Talk	TC1	1. Set S1, S6 to ON. 2. Adjust TC1 so that the reading of the frequency counter is 46.970 MHz±200 Hz (After adjusting, set S6 to OFF).
T4, Q4	(D) TX Power Adjustment	CH1 Talk CH25 Talk	T4 VR104	1. Set S1, S7 to ON (S6, S8, S9 : OFF). 2. Adjust T4 so that the reading of the RF VTVM is peak level. 3. Adjust VR104 so that the reading of the RF VTVM is 230mV±10mV(clock wise from peak) .

When replacing these parts, adjust as shown in table below.

Replace Parts	Adjustment items	Test Mode	Adjustment Point	Procedure
T1	(E) RX Sensitivity Adjustment	CH25 Talk	T1	1. Set S1, S9, S10 to ON (S6, S7, S8 : OFF). 2. Apply a 40dB μVemf output from S.S.G. (modulation frequency 1kHz, dev. 3kHz). 3. Adjust T1 so that the reading of the RF VTVM is maximum output (10~40mV).
T2	(F) Line Output Maximum Adjustment	CH15 Talk	T2	1. Set S1, S3, S9 to ON (S2 : OFF). 2. Apply a 40dB μVemf output from S.S.G. (modalation frequency 1kHz. dev. 3kHz), and adjust T2 so that reading of the AF VTVM is maxmum output and turn T2 clockwise until the line output is 0.5dB down from peak.
VR102	(G) Line Output Level Adjustment	CH15 Talk	VR102	1. Set S1, S3, S9 to ON (S2 : OFF). 2. Apply a 40dB μVemf output from S.S.G (modalation frequency 1kHz. dev. 3kHz). 3. Adjust VR102 so that the reading of the AF VTVM is -5dBm± 0.5dBm(600Ω load) (distortion : lessthan 7%).
VR101	(H) Line Input Modulation Adjustment	CH15 Talk	VR101	1. Set S1, S2, S8, S9 to ON (S3, S6, S7 : OFF). 2. Input via loop simulator 1.0kHz, -20.0dBm (measured at T-R) signal. 3. Apply a 40 dB μVemf output from S.S.G. (modulation frequency 1kHz, dev. 0kHz). 4. Adjust VR101 so that the reading of the FM Deviation Meter is 4.0kHz±0.1kHz.
VR103, IC2	(I) Carrier Sensitivity Adjustment	CH15 Talk	VR103	1. Set S1, S9, S11 to ON (S6, S7, S8 : OFF). 2. Apply a 0dB μVemf output from S.S.G. (modulation frequency 1kHz, dev. 0kHz). 3. Adjust VR103 so that the oscilloscope becomes Low→High.

The connection of adjustment equipments are as shown in pages 13, 14.

■ FOR SCHEMATIC DIAGRAM [KX-TC150H-W (pages 17, 18)]

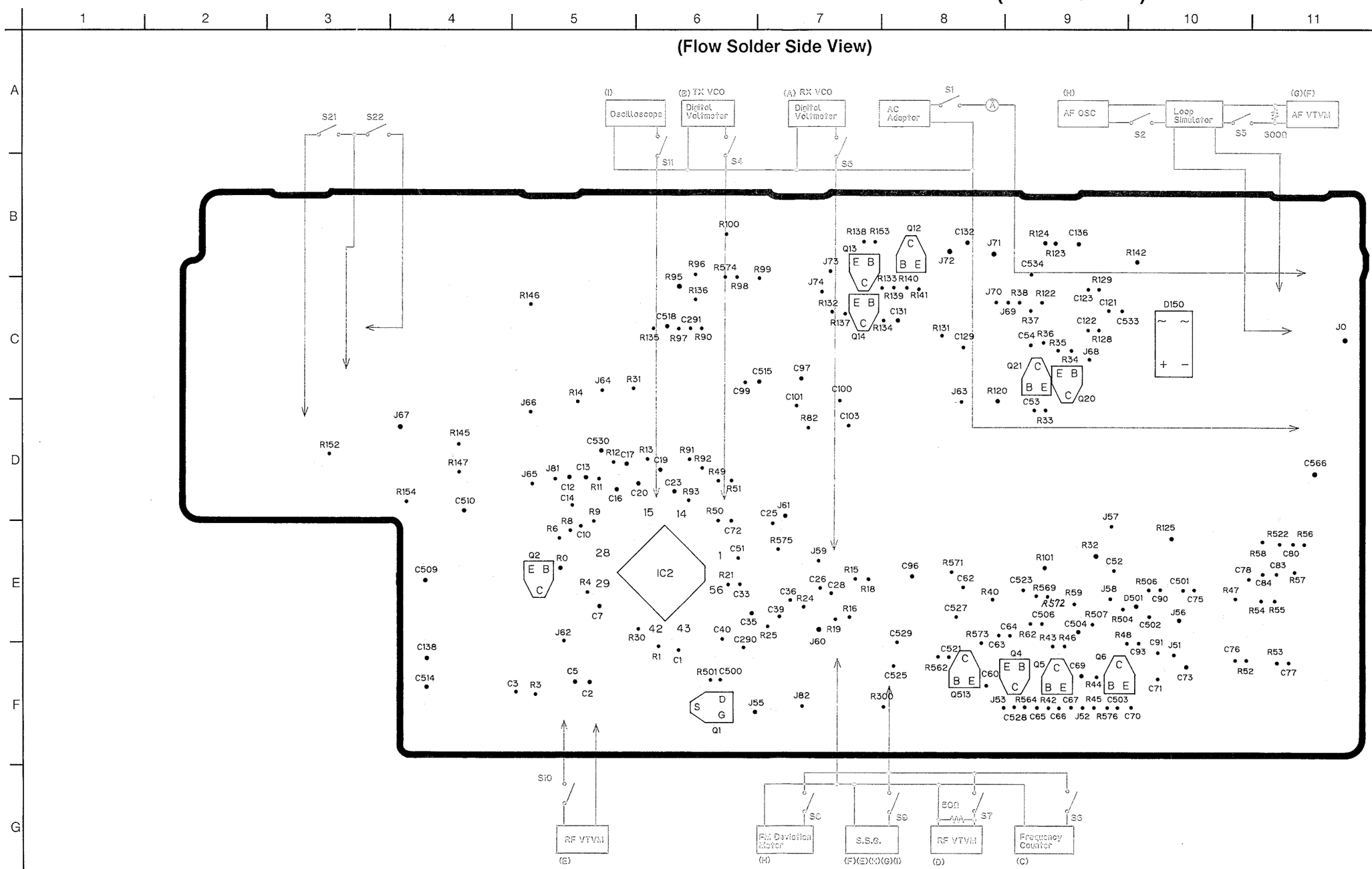
1. S1: Dialing Mode Selector Switch.
2. S2: Handset Locator Switch.
3. DC voltage measurements are taken with electronic voltmeter from negative voltage line.

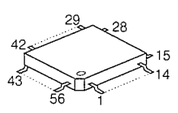
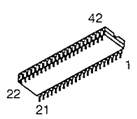
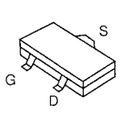
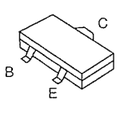
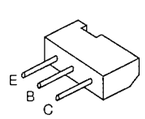
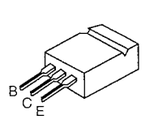
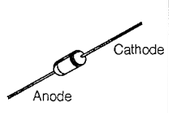
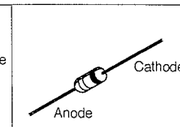
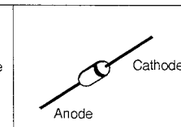
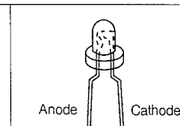
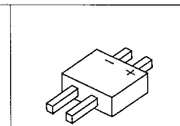
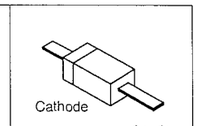
This schematic diagram may be modified at any time with development of new technology.

Important Safety Notice:
The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards.
When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM (KX-TC150H-W)

(Flow Solder Side View)



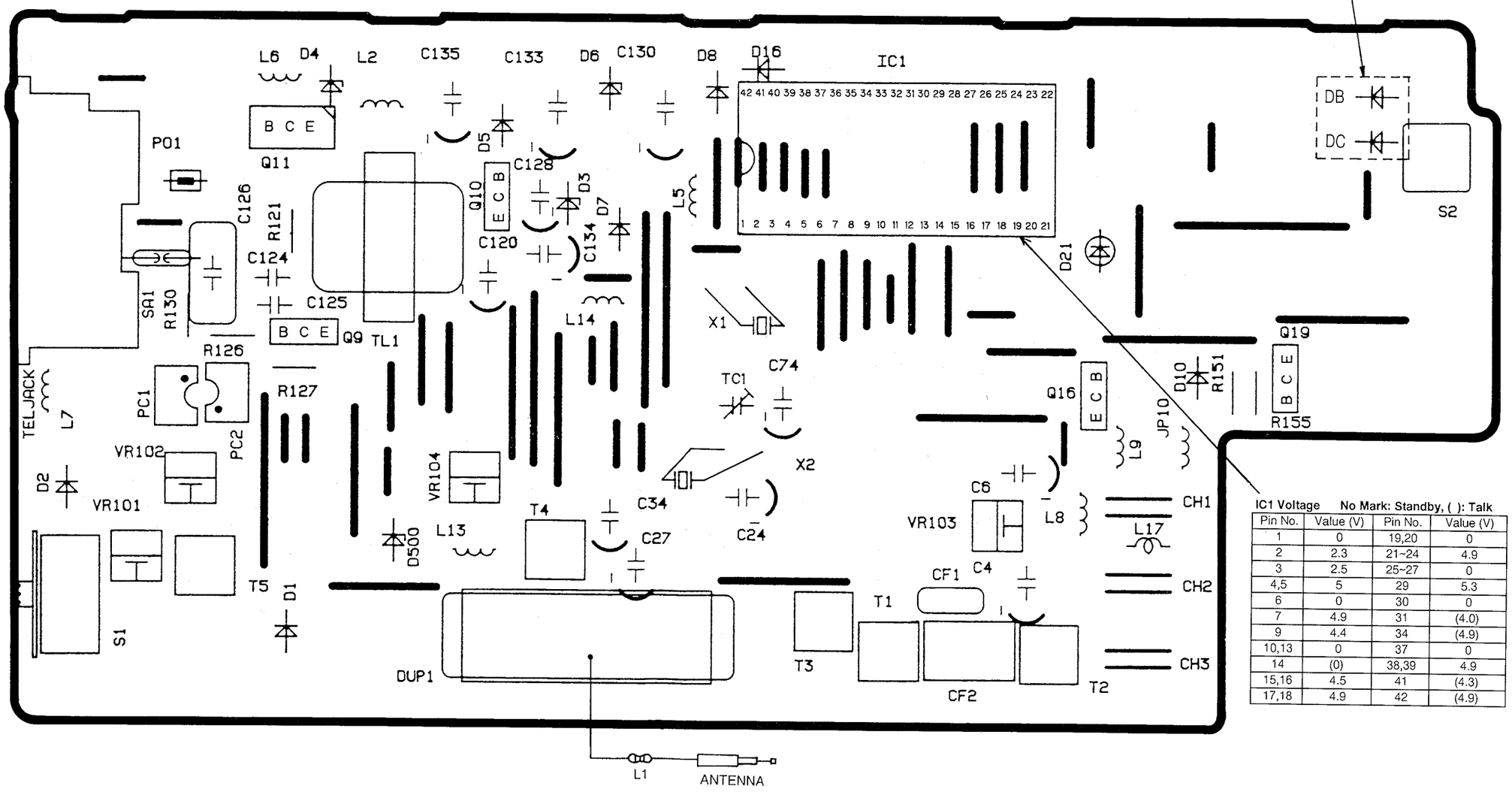
											
AN6185NFA	MN150409KRG1	2SK543	2SD1819A, 2SC2412K, PQVTMSC2295C, 2SB709A, 2SD601R	2SA1776P, 2SD1991A	2SD2136	MA840ATAKU, MA4100	MA4062, MA4047	1SS120,MA4051	LN31GCPHV	PQVDS1ZB40F1	1SS314

CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM (KX-TC150H-W)

(Component View)

CPU Option

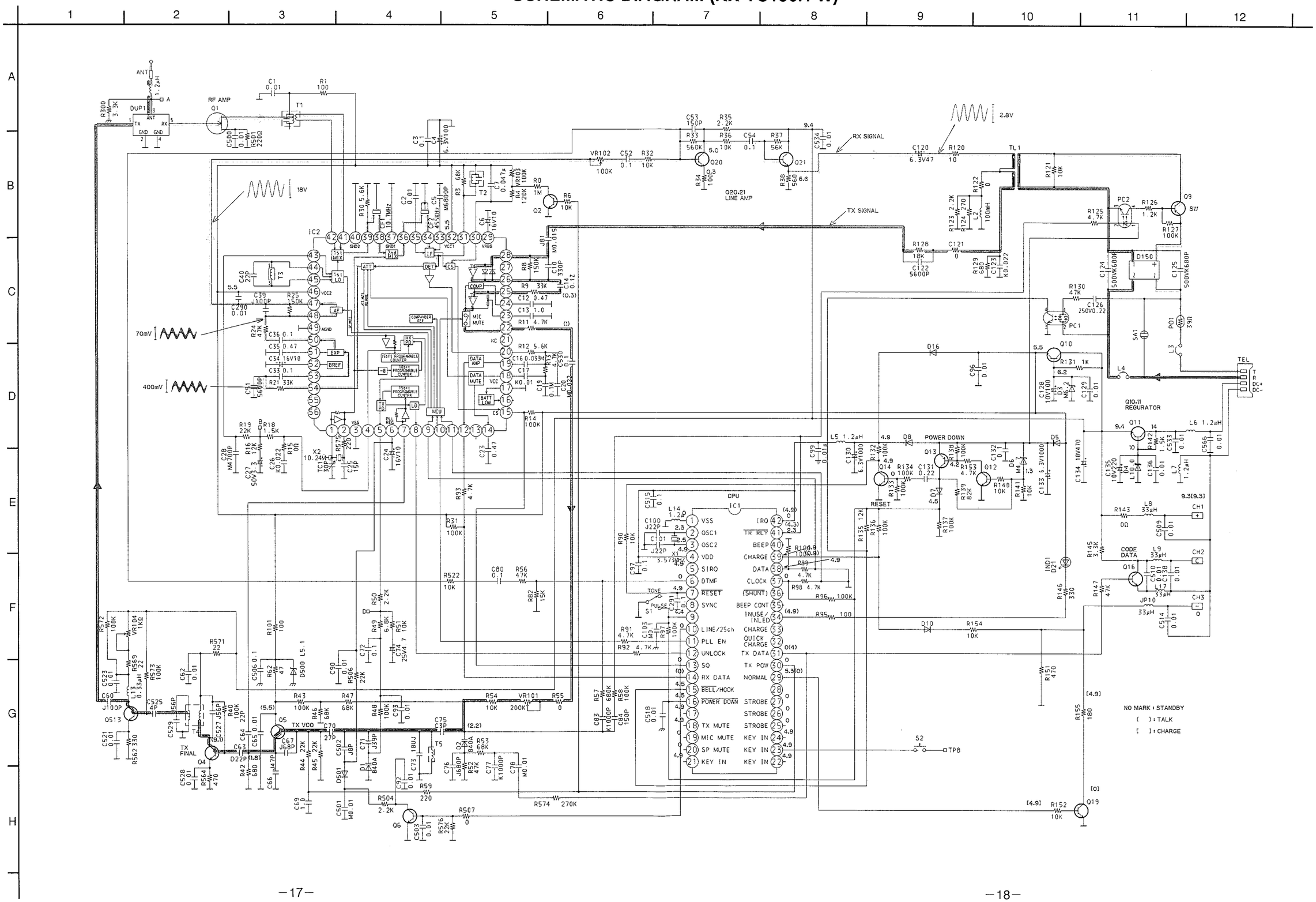
	Option	Diode Open	Diode Connect
DB	Charge	Normal	Ultra
DC	% Break	61%	67%



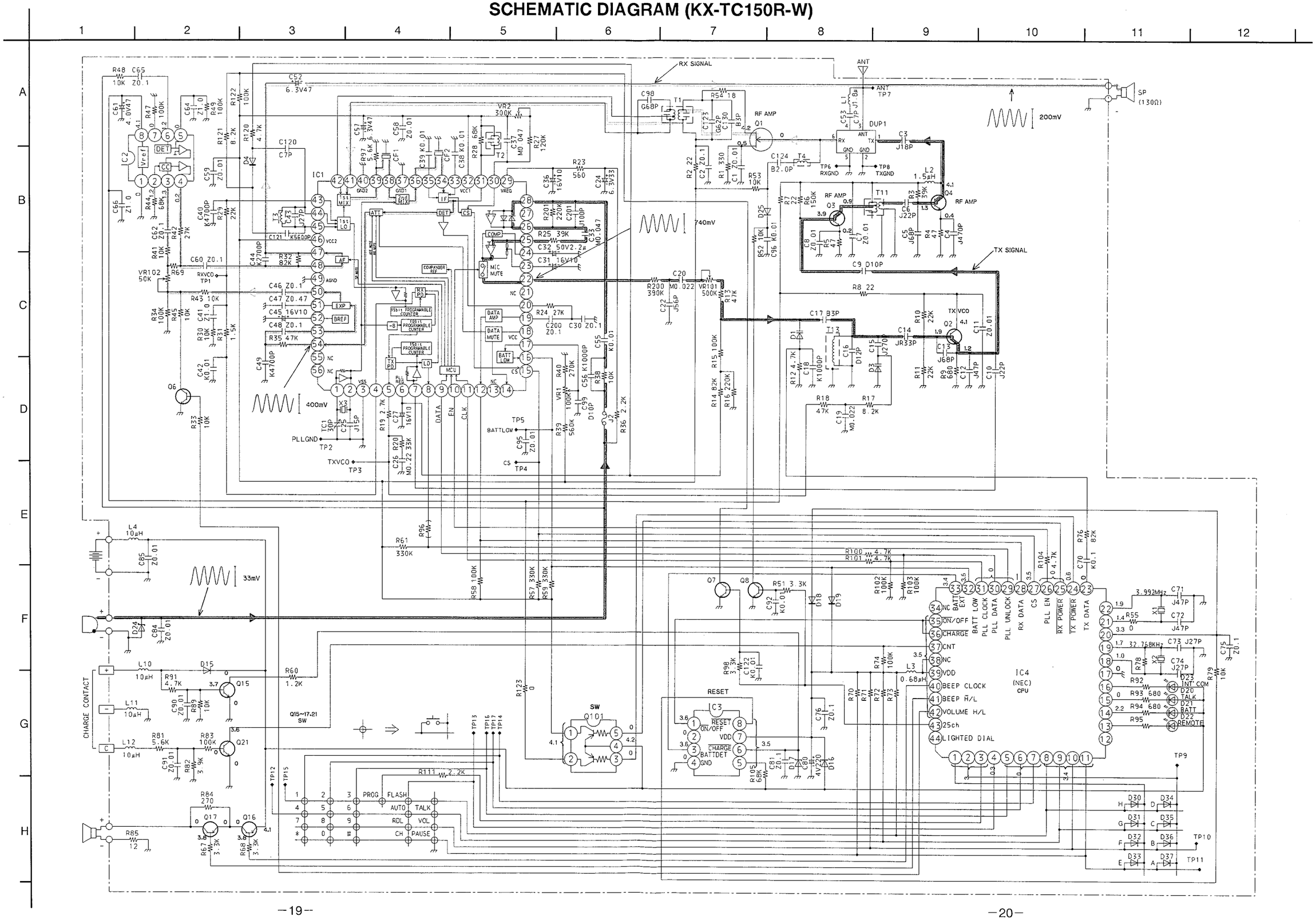
IC1 Voltage No Mark: Standby, ( ): Talk

Pin No.	Value (V)	Pin No.	Value (V)
1	0	19,20	0
2	2.3	21~24	4.9
3	2.5	25~27	0
4,5	5	29	5.3
6	0	30	0
7	4.9	31	(4.0)
9	4.4	34	(4.9)
10,13	0	37	0
14	(0)	38,39	4.9
15,16	4.5	41	(4.3)
17,18	4.9	42	(4.9)

SCHEMATIC DIAGRAM (KX-TC150H-W)

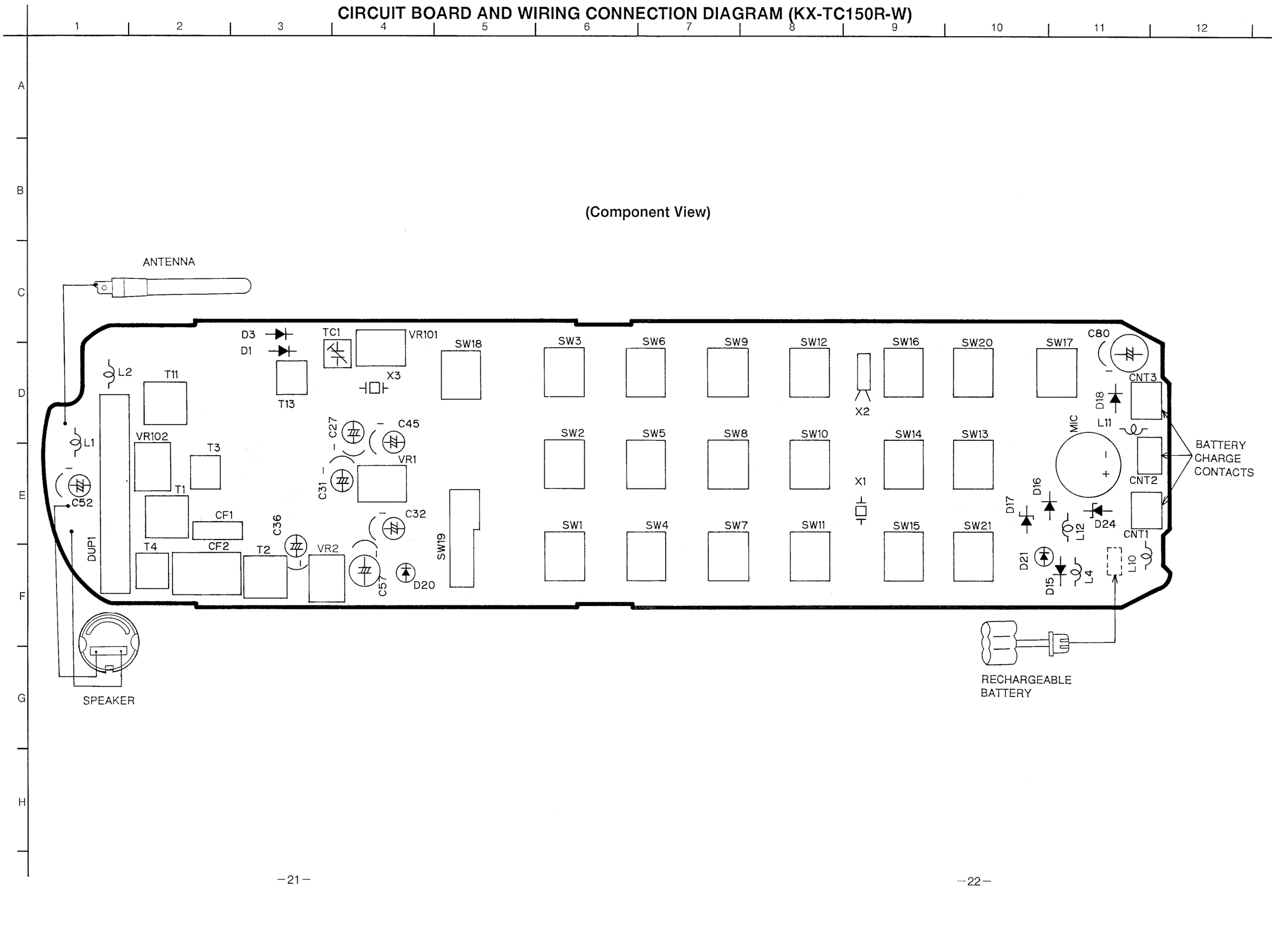


SCHEMATIC DIAGRAM (KX-TC150R-W)



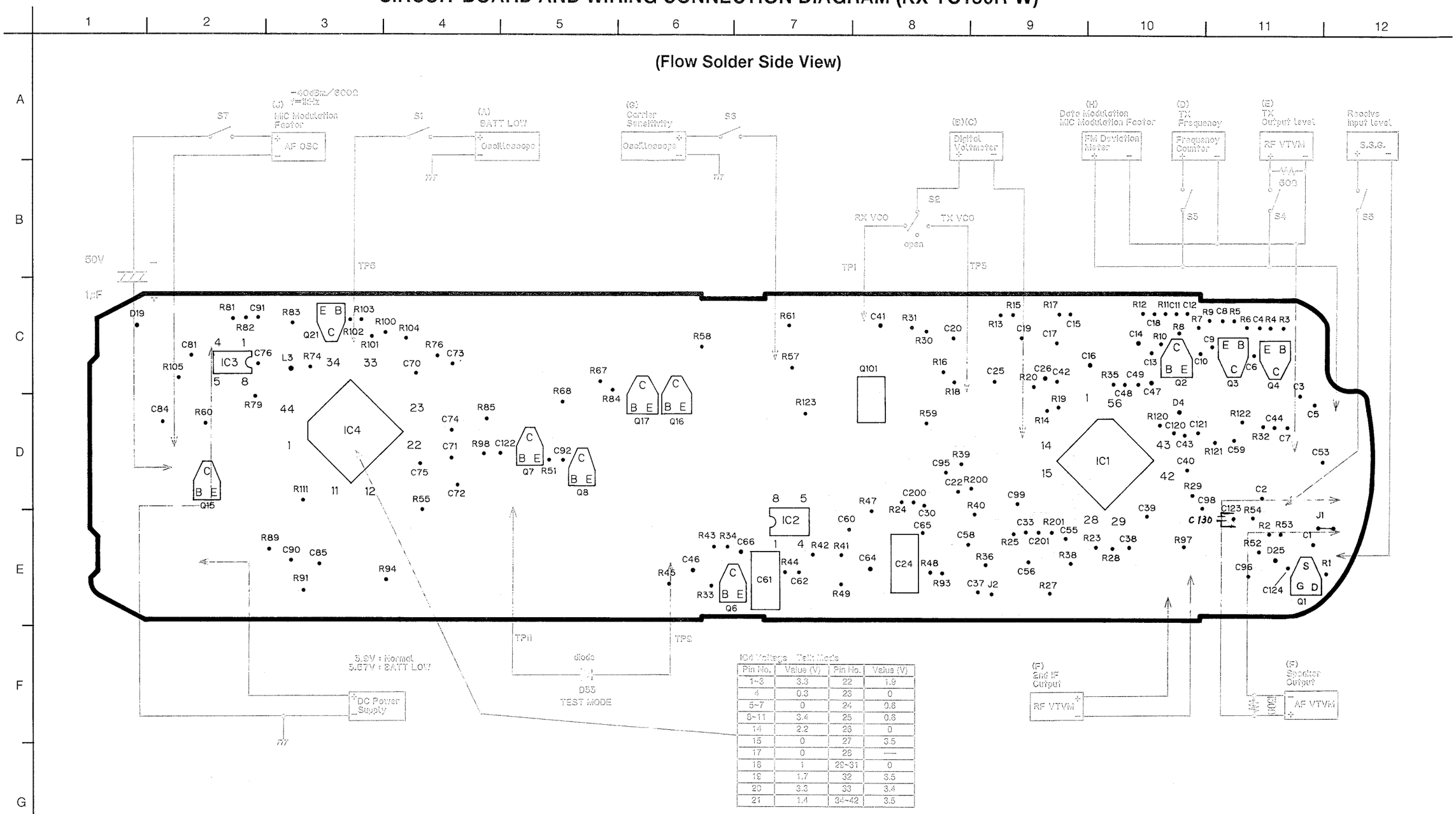
CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM (KX-TC150R-W)

(Component View)



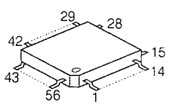
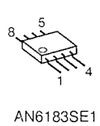
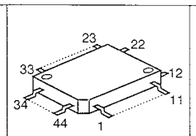
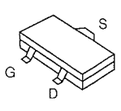
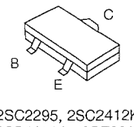
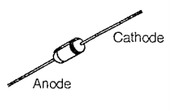
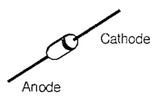
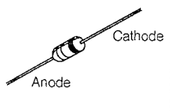
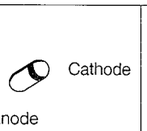
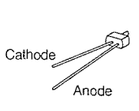
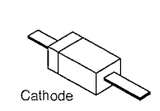
CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM (KX-TC150R-W)

(Flow Solder Side View)



IC4 Voltage Data Mode

Pin No.	Value (V)	Pin No.	Value (V)
1~3	3.3	22	1.9
4	0.3	23	0
5~7	0	24	0.6
8~11	3.4	25	0.6
14	2.2	26	0
15	0	27	3.5
17	0	28	—
18	1	29~31	0
19	1.7	32	3.5
20	3.3	33	3.4
21	1.4	34~42	3.5

 AN6185NFA	 AN6183SE1 PQVISC78184D	 PQVI0006G509	 2SK543	 2SC2295, 2SC2412K 2SD1819A,2SB709A XN1116	 MA840BTAKU MA700A	 PQVD1SV145, 1SS120	 MA4068	 MA110	 LN330GKGAC, LN230RKRAC	 1SS314

ADJUSTMENTS (KX-TC150R-W)

If your unit have below symptoms, adjust each item using remedy column from the table.

Symptom	Remedy
The movement of Battery Low Indicator is wrong.	Make adjustments in item(A)
The base unit dose not respond to a call from portable handset.	Make adjustments in item(B)
The base unit dose not transmit or the transmit frequency is off.	Make adjustments in item(C)
The transmit frequency is off.	Make adjustments in item(D)
The transmit power output is low, and the operating distance between base unit and portable handset is less than normal.	Make adjustments in item(E)
The reception sensitivity of base unit is low with noise.	Make adjustments in item(F)
Does not link between base unit and portable handset.	Make adjustments in item(G), (H)
The reception level is large or small.	Make adjustments in item(I)
The transmit level is large or small.	Make adjustments in item(J)

Unit condltion:

1. Remove the antenna lead wire from P.C Board of portable handset.
2. Power Supply: DC 3.9V
3. Volume switch: HIGH
4. Speaker Load: 130Ω

How to set the test mode.

CH10 Test Mode

1. After connecting the diode D33, and apply a power supply DC 3.9 V.
   (The unit becomes CH25 Talk)
2. Press the talk switch.
   (The unit becomes CH25 standly)
3. Press the Talk Switch.
4. Press the cannel switch,

CH25 → CH1 → CH2·····CH24

When replacing these parts, adjust as shown in table below.

Replace Parts	Adjustment items	Test Mode	Adjustment Point	Procedure
VR1	(A) Battery Low Adjustment	CH25 Talk	VR1	1. Set S1 to ON. 2. Set the power supply voltage to DC 3.57V, and adjust VR1 so that the reading of oscilloscope is High → Low.
IC1, TC1, X3, T13	(B) TX VCO Voltage Adjustment	CH25 Talk	T13	1. Set S2 to TX VCO side. 2. Adjust T13 so that the reading of digital voltmeter is 2.0 V ±0.1 V (After adjusting, set S2 to OFF).
IC1, TC1, X3, T3	(C) RX VCO Voltage Adjustment	CH25 Talk	T3	1. Set S2 to RX VCO side. 2. Adjust TC3 so that the reading of digital voltmeter is 1.5 V±0.1 V (After adjusting, set S2 to OFF).
TC1, X3, IC1	(D) TX frequency Adjustment	CH25 Talk	TC1	1. Set S3 to ON. 2. Adjust TC1 so that the reading of frequency counter is 49.970 MHz±200 Hz (After adjusting, set S3 to OFF).

KX-TC150-W

When replacing these parts, adjust as shown in table below.

Replace Parts	Adjustment items	Test Mode	Adjustment Point	Procedure
T11	(D) TX Output Adjustment	CH1 Talk	T11	1. Set S4 to ON (S3:OFF). 2. Adjust T11 for 200mV~350mV output on RF VTVM (50Ω load) (After adjusting, set S4 to OFF).
T1, T3	(F)RX Adjustment (Speaker Output) (2nd IF Output)	CH1 Talk	T2 T4	1. Set S5 to ON (S3, S4: OFF). 2. Apply a 45 dB μVemf output from S.S.G. (modulation frequency 1 kHz, dev. 3kHz) 3. Adjust T2 so that the reading of AF VTVM is maximum output. 4. Apply a 45 dB μVemf output from S.S.G. (modulation frequency 1kHz, dev. 3kHz) 5. Adjust T4 so that the reading of RF VTVM is maximum output (15~36mV).
VR2	(G) Carrier Sensitivity Adjustment	CH25 Talk	VR2	1. Set S6 to ON. 2. Apply a 10 dB μVemf output from S.S.G.(modulation frequency 1kHz, dev. 0kHz) and adjust VR2 when oscilloscope becomes to low.
	(H) Data Moudulation of Confirmation	CH25 Talk	—	1. Set S3 to ON. 2. Keep pressing the flash button. 3. Confirm for a 5.5~8.5 kHz FM Deviation Meter reading.
VR102	(I) Speaker Output Levle Adjustment	CH25 Talk	VR102	1. Set S5 to ON. 2. Apply a 40 dB μVemf output from S.S.G.(modulation frequency 1kHz, dev. 3kHz). 3. Adjust VR102 so that the reading of AF VTVM is -29dBm. (distortion: less than 6%) (volume: normal)
VR101	(J) MIC Modulation Factor Adjustment	CH1 Talk	VR101	1. Set S3, S7 to ON. 2. Apply a MIC signal (1kHz, -40 dBm at 600 Ω load). 3. Adjust VR 101 so that the reading of FM Deviation Meter is 2.5kHz±0.1kHz.

The connections of adjustment equipments are as shown in pages 23, 24.

■ For SCHEMATIC DIAGRAM [KX-TC150R-W (Pages 19, 20)]

1. SW1~10, 12: Dialing Switch
2. SW11: Tone Switch
3. SW13: Program Switch
4. SW14: Flash Switch
5. SW15: Auto Switch
6. SW16: Redial Switch
7. SW17: Channel Switch
8. SW19: Talk Switch
9. SW20: Volume/Ringer Switch
10. SW21: Pause Switch
11. DC voltage measurements are taken with electronic voltmeter from negative voltage line. (Talk Posittion)

This schematic diagram may be modified at any time with the development of new technology.

FREQUENCY TABLE (MHz)

	KX-TC150H-W		KX-TC150R-W	
	Transmit Frequency	Receive Frequency	Transmit Frequency	Receive Frequency
1	43.720	48.760	48.760	43.720
2	43.740	48.840	48.840	43.740
3	43.820	48.860	48.860	43.820
4	43.840	48.920	48.920	43.840
5	43.920	49.020	49.020	43.920
6	43.960	49.080	49.080	43.960
7	44.120	49.100	49.100	44.120
8	44.160	49.160	49.160	44.160
9	44.180	49.200	49.200	44.180
10	44.200	49.240	49.240	44.200
11	44.320	49.280	49.280	44.320
12	44.360	49.360	49.360	44.360
13	44.400	49.400	49.400	44.400
14	44.460	49.460	49.460	44.460
15	44.480	49.500	49.500	44.480
16	46.610	49.670	49.670	46.610
17	46.630	49.845	49.845	46.630
18	46.670	49.860	49.860	46.670
19	46.710	49.770	49.770	46.710
20	46.730	49.875	49.875	46.730
21	46.770	49.830	49.830	46.770
22	46.830	49.890	49.890	46.830
23	46.870	49.930	49.930	46.870
24	46.930	49.990	49.990	46.930
25	46.970	49.970	49.970	46.970

KX-TC150-W

RF SPECIFICATION

BASE UNIT (KX-TC150H-W)

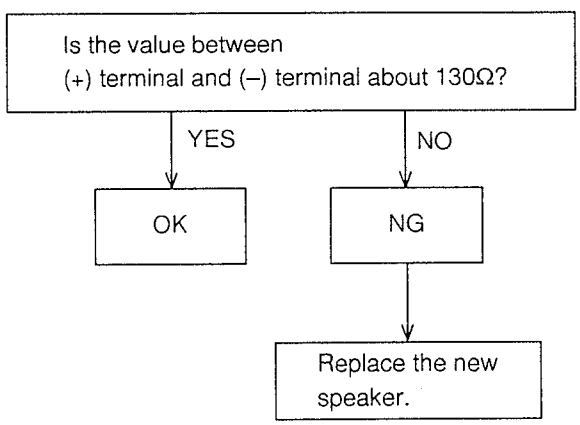
Item	Value	Refer to —.	Remarks
TX Frequency	46.970 MHz±200Hz	Page 11 (C)	at CH25
TX Power	230 mV±10mV	Page 11 (D)	
TX Modulation factor	3.8 kHz~4.2 kHz	———	
TX Modulation Distortion	Less than 7%	———	
Line Modulation factor (Max.)	5.5 kHz~7.5 kHz	———	
Data Modulation factor	6.0 kHz~7.0 kHz	———	

PORTABLE HANDSET (KX-TC150R-W)

Item	Value	Refer to —.	Remarks
Practical Sensitivity	Less than 9 dBμV	———	at CH1
Carrier Sensitivity	Less than 13 dBμV	———	High→Low
TX Frequency	46.970 MHz±200Hz	Page 25 (D)	at CH25
TX Output	200 mV~350 mV	Page 26 (E)	at CH1 (Antenna soldering point 50Ω Load)
Data Modulation factor	5.5 kHz/dev~8.5 kHz/dev	Page 26 (H)	at CH25
MIC Modulation factor	2.2 kHz/dev~2.8 kHz/dev	———	at CH1 (MIC terminal -40dBm Input)

HOW TO CHECK THE PORTABLE HANDSET SPEAKER

1. Prepare the digitial voltmeter, and set the selector knob to ohm meter.
2. Put the probes at the speaker terminals as shown in Fig. 6
3.



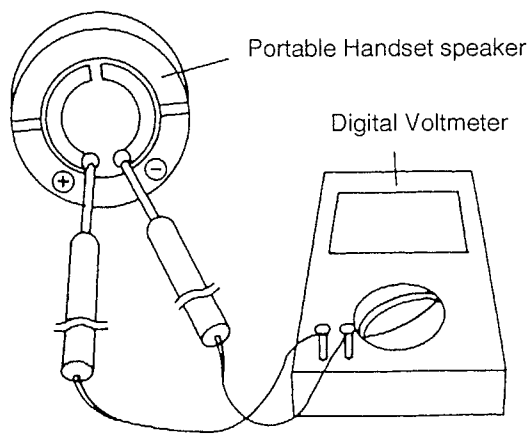


Fig. 6

EXPLANATION OF CPU DATA COMMUNICATION

1. Standby → TALK

A. The base unit continuously scans the portable handset's TX frequencies of the 10 original channels (a). Also, the base unit scans the portable handset's TX frequencies of the 15 new channels (b), until a vacant (b) channel is found.

a. The base unit stores the number of the vacant (b) channel, and the status of all 10 (a) channels into memory.

[1] When the user pushes the TALK button, the portable handset sends a TALK-ACK request to the base unit. [on the portable handset's (a) TX frequency]

[2] The base unit sends an ACK-OK to the portable handset. [on the base unit's (a) TX frequency]

a. This ACK-OK includes the number of the 2 vacant channels.
One vacant (a) channel and the vacant (b) channel selected and stored in step Aa.

[3] The portable handset checks the portable handset's RX frequency of the vacant (b) channel selected & stored in step Aa. If this channel is vacant, then the portable handset proceeds to step 4a. If this channel is not vacant, then the portable handset proceeds to step 4b.

[4] a. The portable handset sends a TALK-COMMAND. This TALK-COMMAND includes the number of the vacant (b) channel selected and stored in step Aa. This TALK-COMMAND is sent on the handset's (a) TX frequency.

After sending the TALK-COMMAND, the portable handset changes to the vacant (b) channel. Then, the base unit seizes the telephone line and changes to the vacant (b) channel.

b. The portable handset sends a TALK-COMMAND. This TALK-COMMAND includes the number of the vacant (a) channel selected in step 2a. This TALK-COMMAND is sent on the handset's (a) TX frequency.

After sending the TALK-COMMAND, the base unit seizes the telephone line. [The base unit and portable handset have been communicating on an (a) channel since step 1. Therefore they both remain on that (a) channel]

[5] A dial tone is heard.

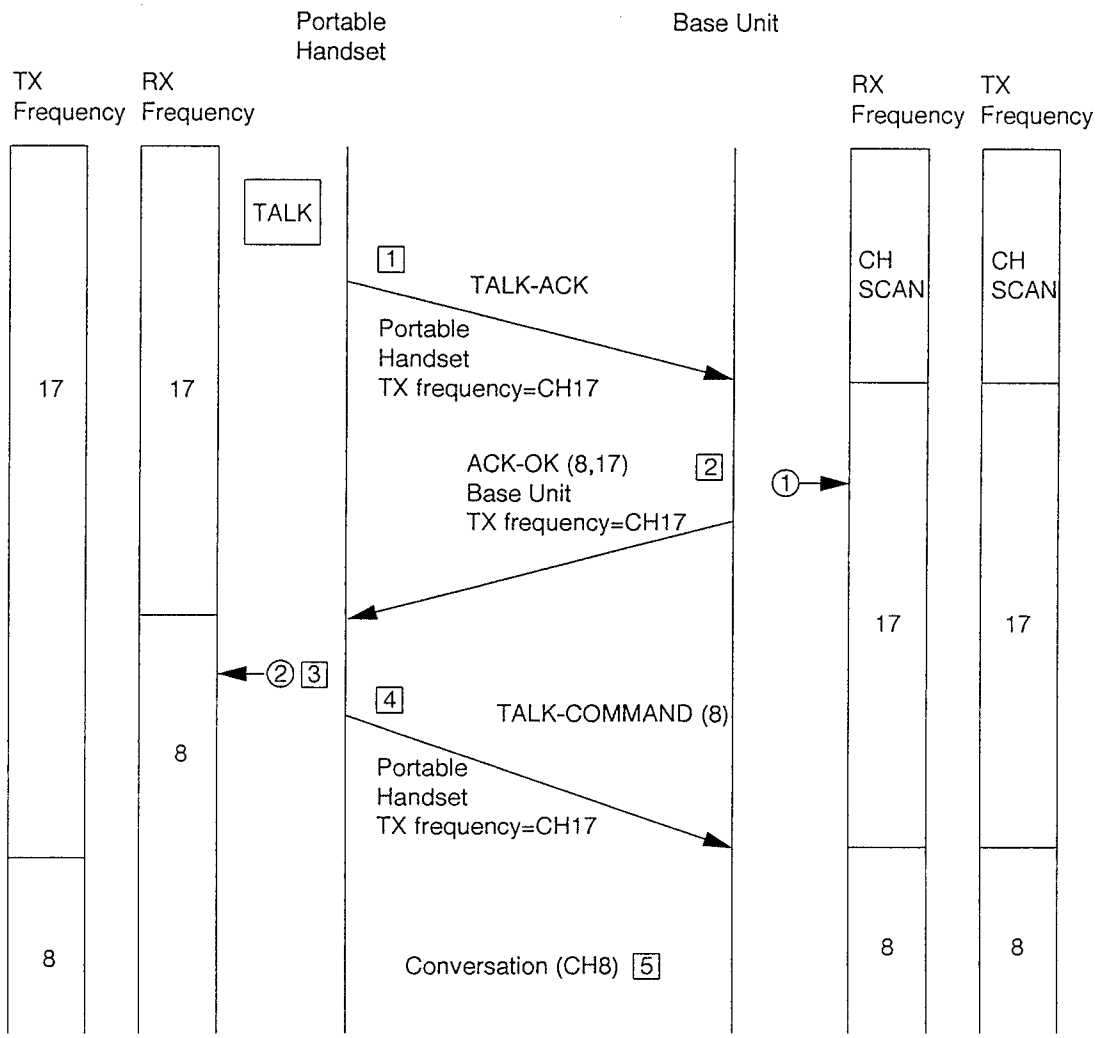
Notes:

All data communication between the portable handset and base unit is done on one of the (a) channels prior to completing the link in step 5.

(a) - channels 16-25 (old) - these channels are paired, as per FCC requirements
(b) - channels 1-15 (new) - these channels are paired, as per the manufacturer's choice

OUTGOING CALL MODE (STANDBY → TALK):

ex) Base Unit : Select channel (b) is vacant ①
Portable Handset : Select channel (b) is vacant ②



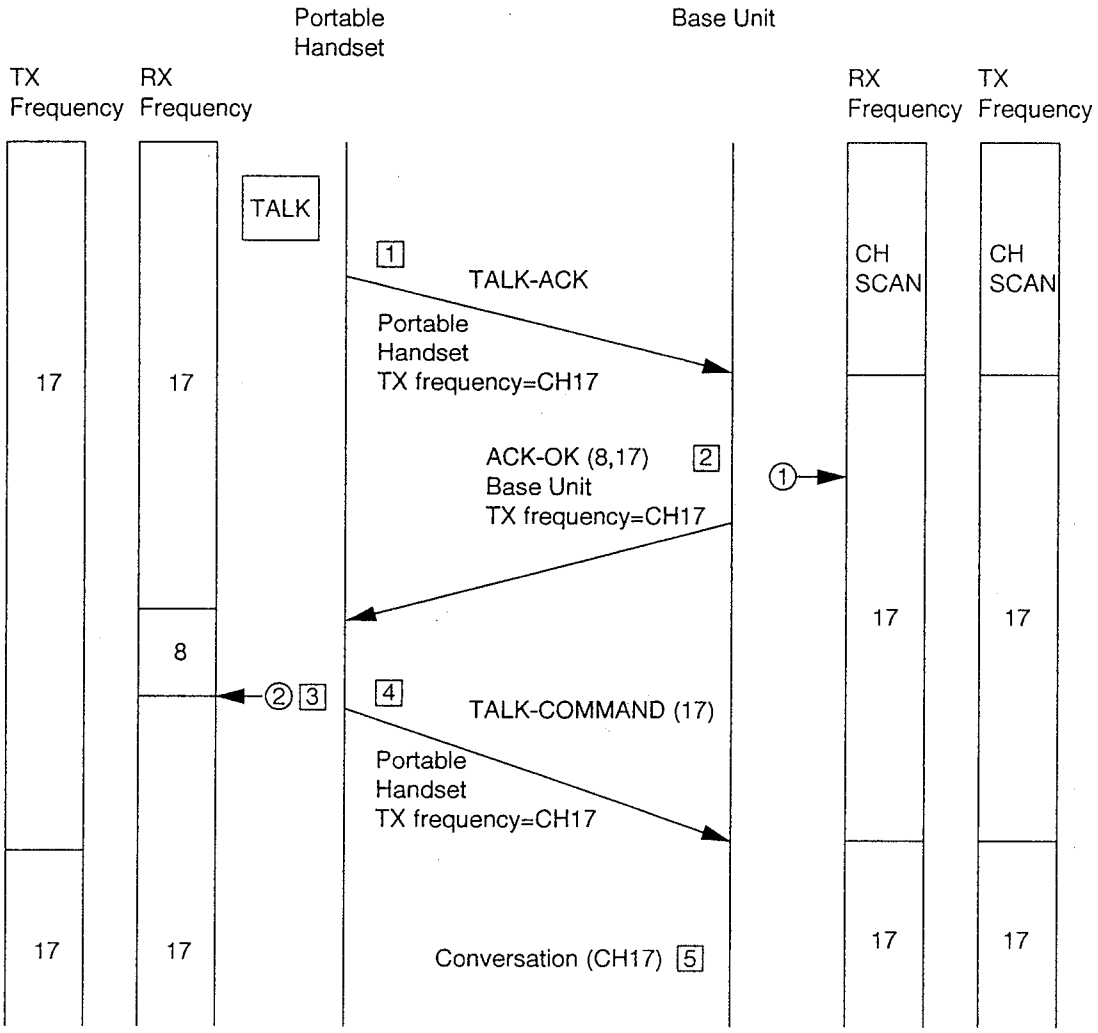
① When the base unit is scanning, the base unit's RX frequency CH8 is vacant.
The base unit sends an ACK-OK, which includes the numbers 8 and 17.

② The portable handset checks the portable handset RX frequency CH8.
The RX frequency CH is vacant.
The portable handset sends TALK-COMMAND, which includes the number 8.

Note: Channel (a) 16-25
Channel (b) 1-15 (New Channel)

OUTGOING CALL MODE (STANDBY → TALK):

ex) Base Unit : Select channel (b) is vacant ①
Portable Handset : Select channel (b) is occupied ②



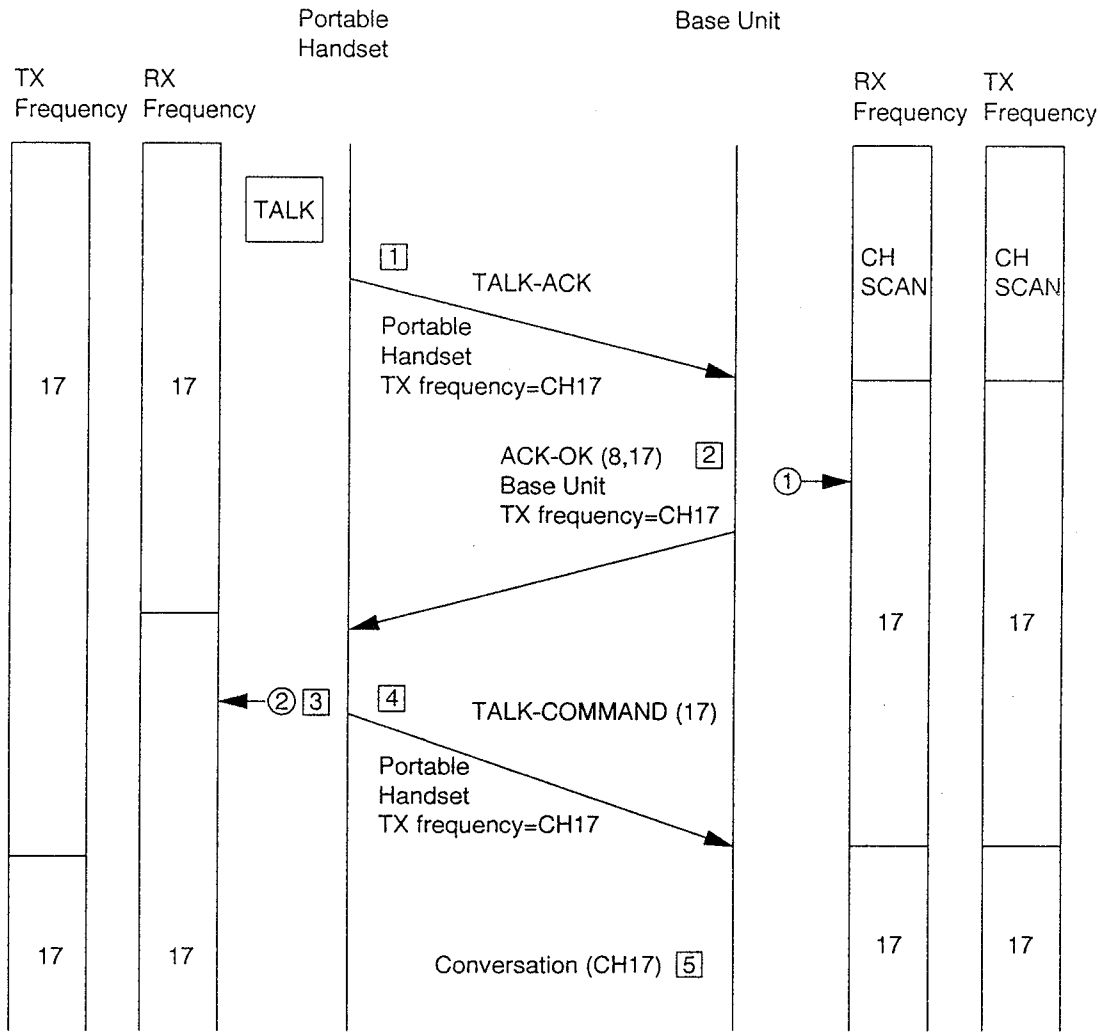
① When the base unit is scanning, the base unit's RX frequency CH8 is vacant.
The base unit sends an ACK-OK, which includes the numbers 8 and 17.

② The portable handset checks the handset RX frequency CH8.
The portable handset RX frequency CH8 is occupied.
The portable handset doesn't use CH8.
The portable handset sends TALK-COMMAND, which includes the number 17.

Note: Channel (a) 16-25
Channel (b) 1-15 (New Channel)

OUTGOING CALL MODE (STANDBY → TALK):

ex) Base Unit : All of channel (b) is occupied ①



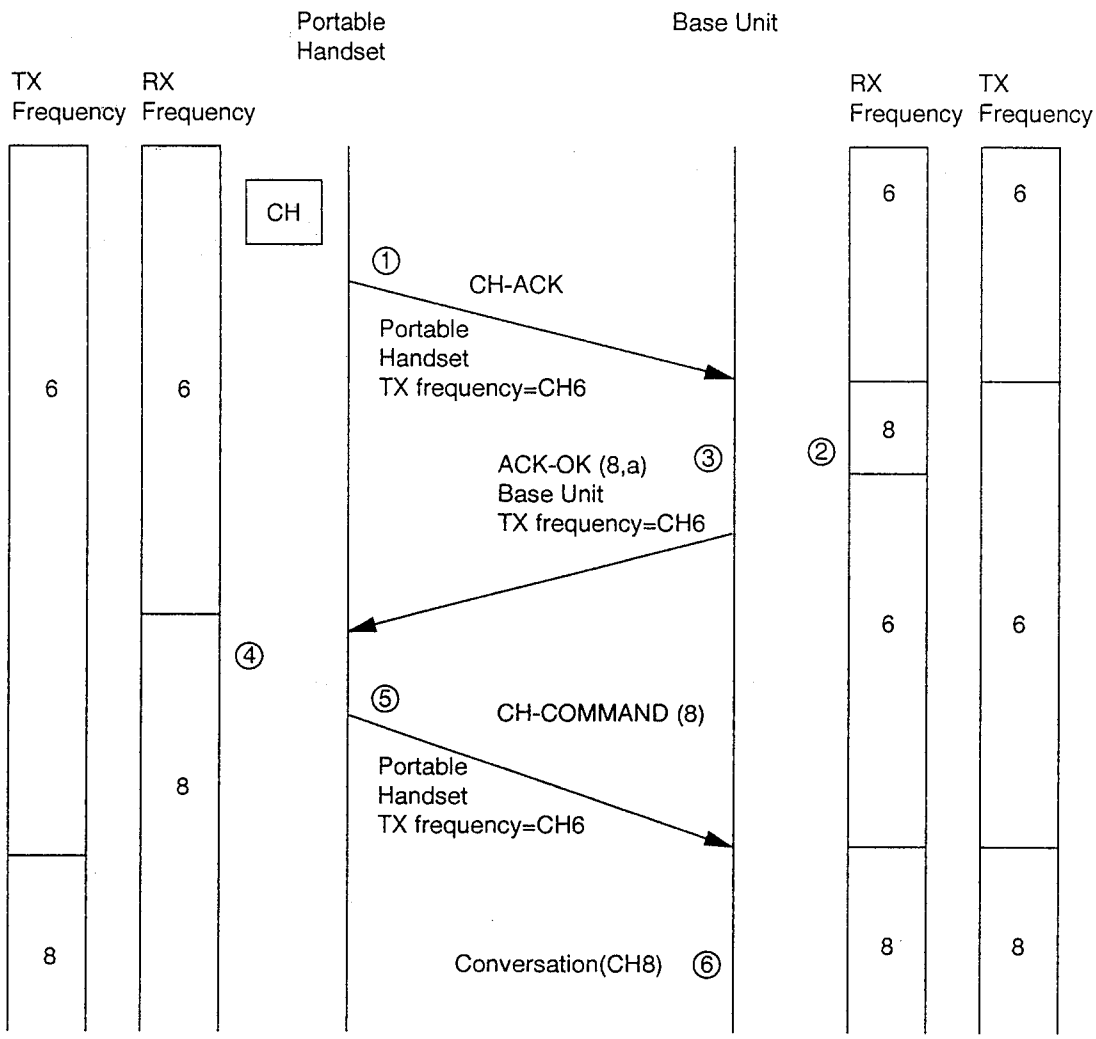
① When the base unit is scanning, the base unit's RX frequency Channel (b) is vacant.
The base unit sends an ACK-OK, which includes the number 17 only.

② The portable handset does not check the handset RX frequency.
The portable handset sends TALK-COMMAND, which includes the number 17.

Note: Channel (a) 16-25
Channel (b) 1-15 (New Channel)

CH CHANGE MODE:

ex): (CH6 → CH8)



① When the user pushes the CH button, the portable handset sends a CH-ACK request to the base unit. (on the portable handset's conversation frequency)

② The base unit checks the base unit's RX frequency of the vacant (b) channel selected at random.

③ The base unit sends a ACK-OK.
This ACK-OK includes the number of the 2 vacant channels.
One vacant (a) channel and the vacant (b) channel selected in step 2.

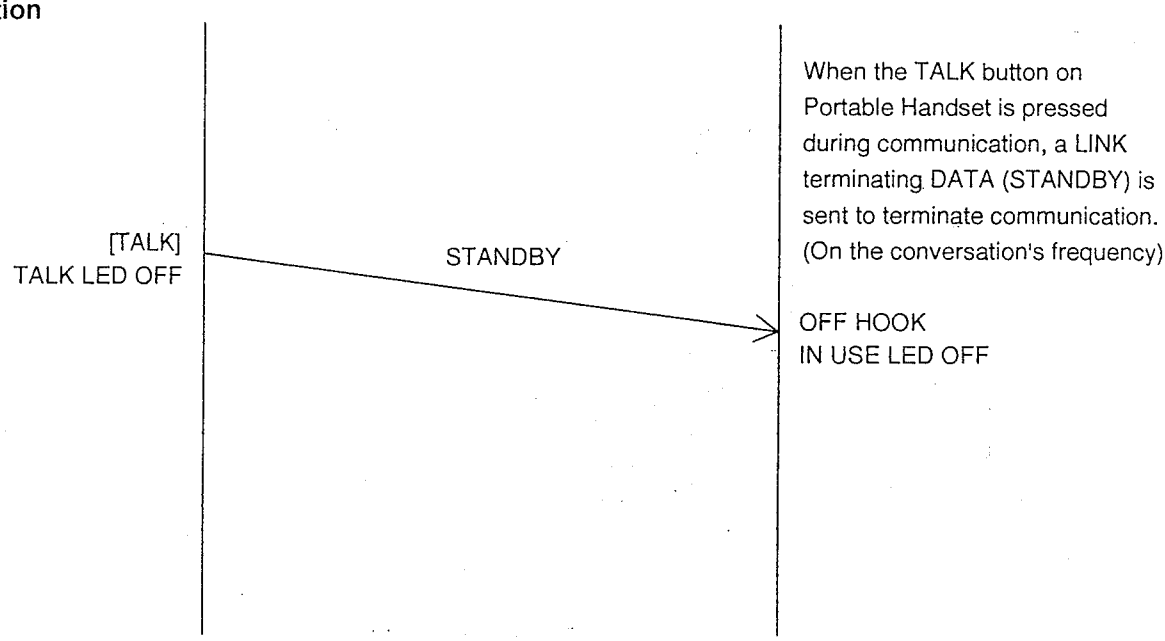
④ The portable handset checks the handset's RX frequency of the vacant (b) channel in step 2.

⑤ The portable handset sends a CH-COMMAND.
This CH-COMMAND includes the number of the vacant (b) channel.
After sending the CH-ACK, portable handset changes to a vacant (b) channel.

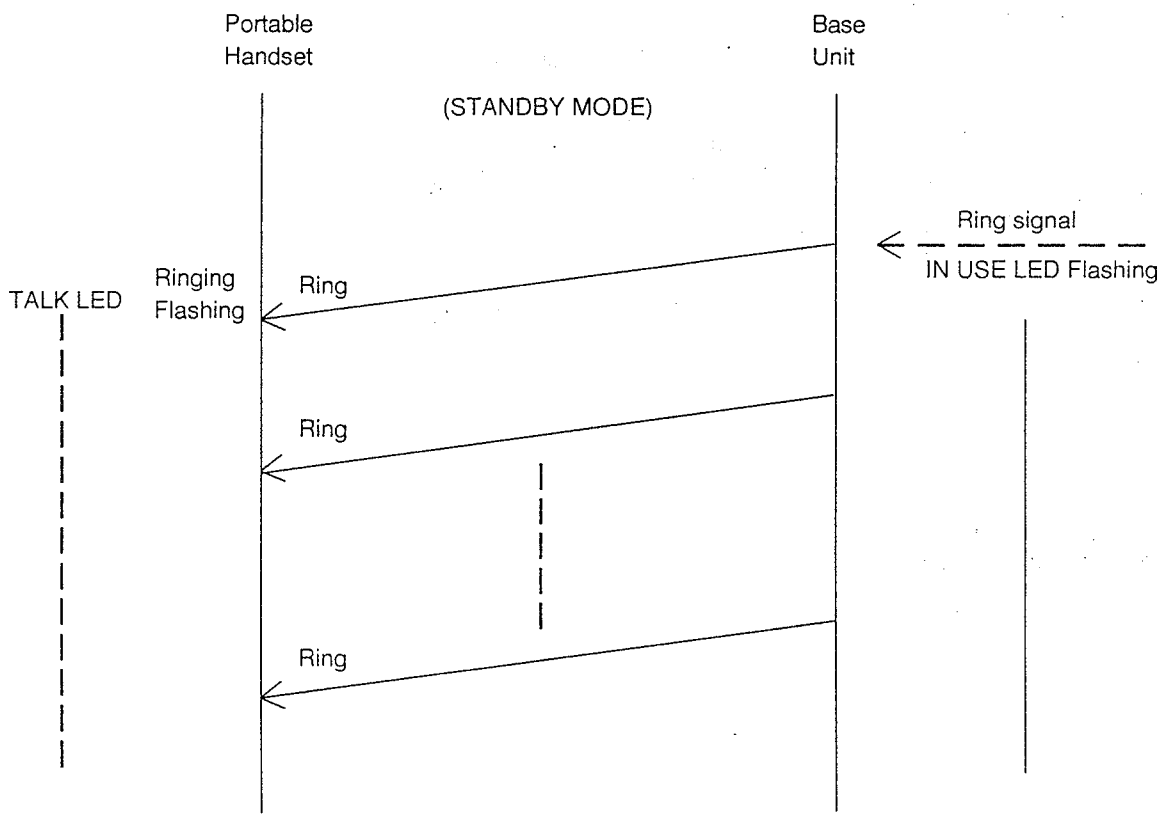
⑥ The base unit changes to the vacant (b) channel.
The a conversation can be accessed.

Note: (a) - Channels 16-25 (Old)
(b) - Channels 1-15 (New)

2. To terminate Communication



3. Ringing



After detecting the Ring signal from circuit, Base Unit sends a ring signal DATA (Ring) on the base's (a) TX frequency, then the Portable Handset starts ringing.

Note: (a) is channels 16-25 (old)···these channels are paired as per FCC requirements.

4. Ports for transmitting and receiving of data

Portable Handset :	transmitting ... 23 Pin	receiving ... 28 Pin
Base Unit :	transmitting ... 31 Pin	receiving ... 14 Pin

5. Waveform of DATA used for cordless transmission and reception

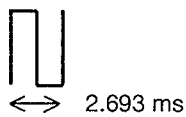
The DATA which is transmitted from the Portable Handset to the Base Unit is combination of DATA 0, DATA 1, DATA Delimt, Pre data and End data of P1.

The DATA which is transmitted from the Base Unit to the Portable Handset is combination of DATA 0, DATA 1, DATA Delimt, Pre data and End data of P2.

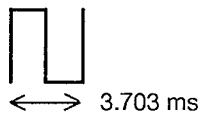
PORTABLE HANDSET

Transmitting DATA Format

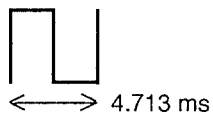
DATA 0



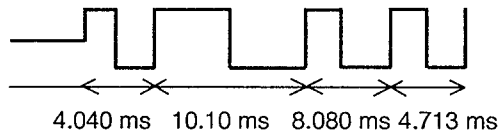
DATA1



DATA Delimt

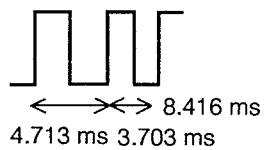


Pre data



26.933 ms

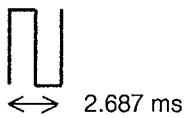
END data



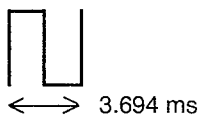
BASE UNIT

Transmitting DATA Format

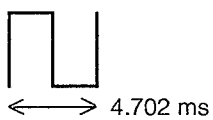
DATA 0



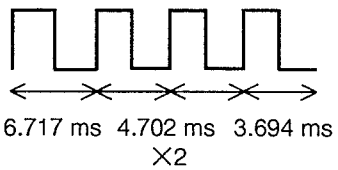
DATA1



DATA Delimt

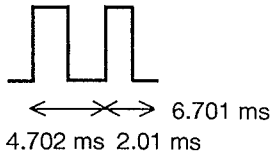


Pre data

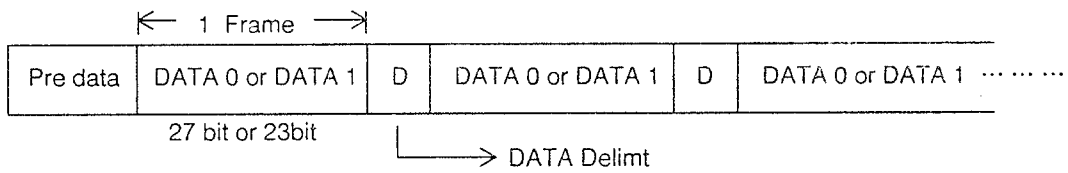


19.77 ms

END data

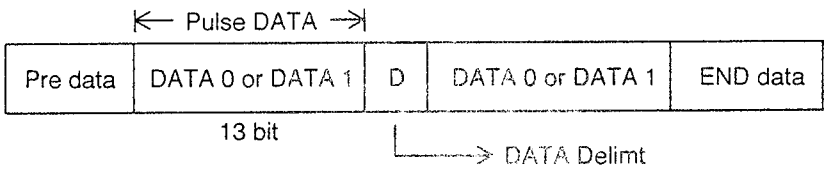


6. When LINKing



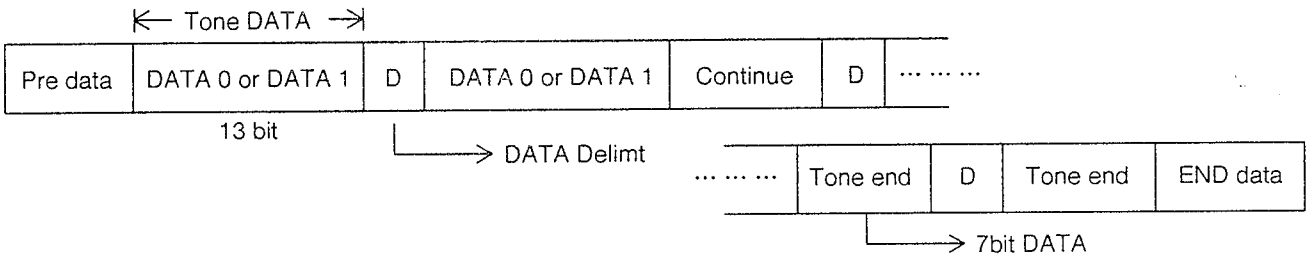
When LINKing from the Portable Handset (when becoming STBY to TALK), DATA is transmitted in above format. The combined portion of DATA 0 and DATA 1 is transmitted in LINK requesting DATA(27bit) format first.Then,when LINK OK(ACK-OK) DATA (23bit) is returned from the Base Unit, it is sent as LINK from DATA after changing the combination of DATA 0 and DATA 1. And the DATA Delimt is between each Frame as a stop.
The contents of LINK requesting DATA and LINK from DATA are different depending on each operation.

7. Pulse Dial



When executing Pulse Dial,the Pulse Dial DATA is transmitted from the Portable Handset to the Base Unit in above format.
The combination of DATA 0 and DATA 1 are changed by each Dial No. And the DATA Delimt is between each Frame as a stop.
The number of Frame is 2.

8. Tone Dial

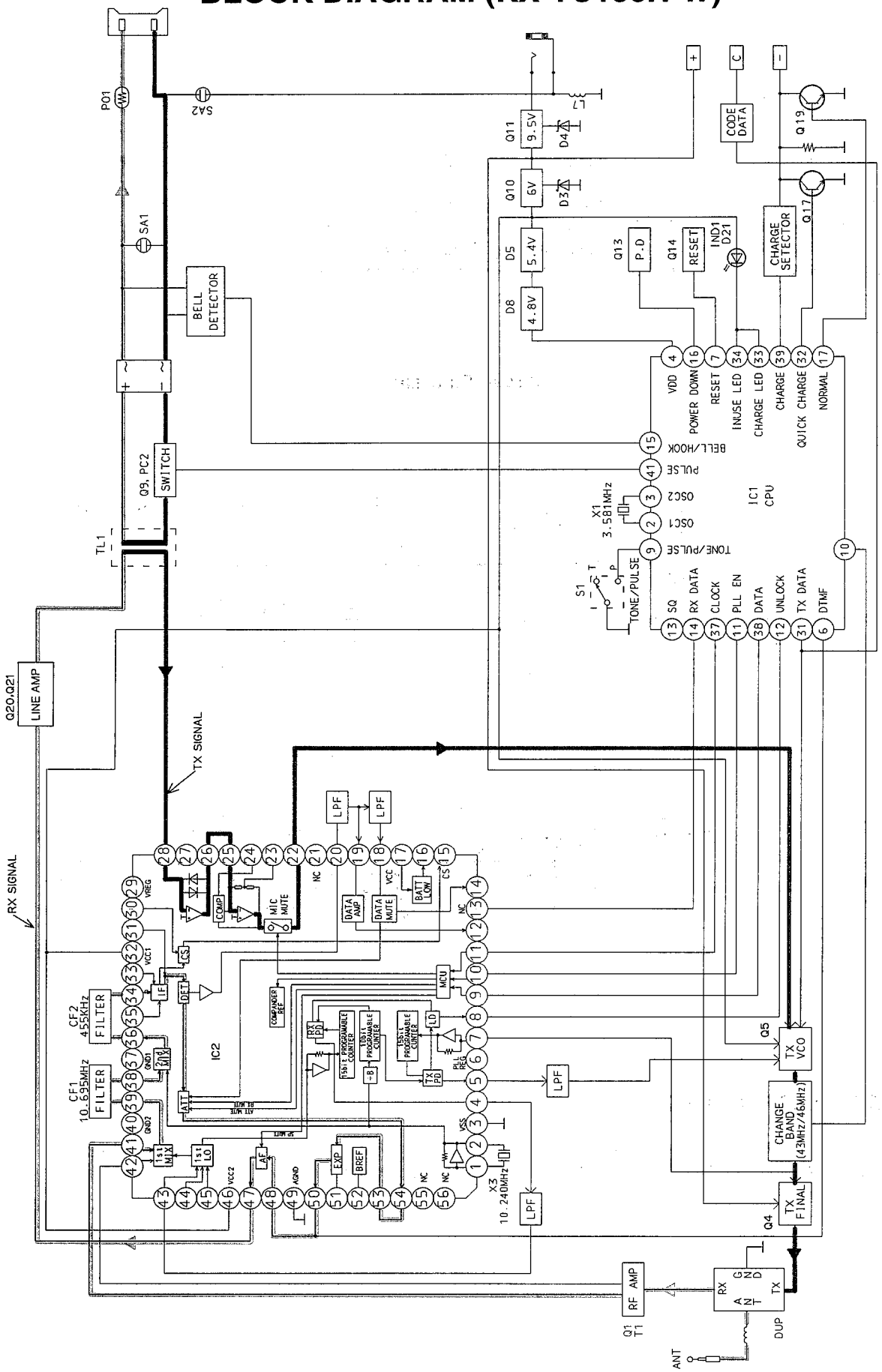


When executing Tone Dial, Tone Dial DATA is transmitted from the Portable Handset to the Base Unit in above format.
The DATA is changed by Dial No. as same as Pulse Dial. When Tone Dialing, DATA (Continue DATA) that the key is pressed continuously is sent to the Base Unit during the key is pressed. When depressing the key, the TONE Dial exterminating DATA (Tone end DATA) is send, and the END data is sent finally.

NOTE

65,000 kinds of the security code are available for the model KX-TC150-W. Each time the portable unit is set on the cradle of the base unit (for charging), the CPU automatically change the security code.

BLOCK DIAGRAM (KX-TC150H-W)



NEW CIRCUIT OPERATION (KX-TC150H-W)

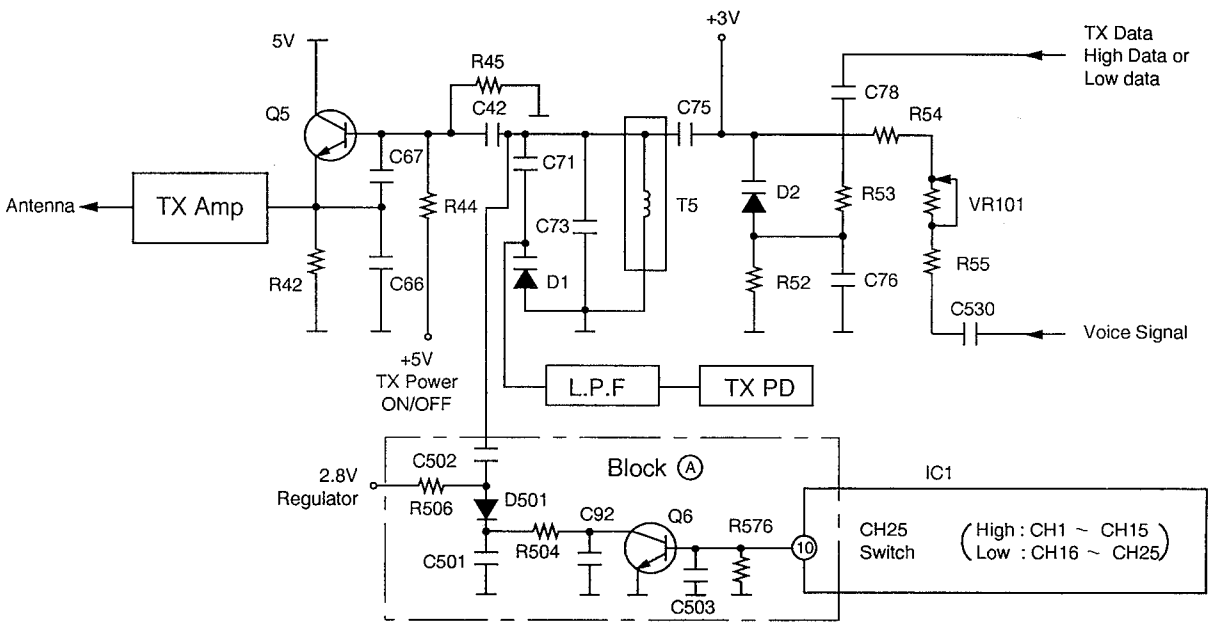
■ TRANSMITTER CIRCUIT

The voice signal or data signal sent to the portable handset is applied to the cathode and the anode of variable capacitor diode D2, as shown in below Fig. 25.

The transmitter frequencies 43~44 MHz band (CH1~CH15) and 46 MHz band are selected by block Ⓐ circuit.

(1) CH1~CH15: Pin 10 of IC1 becomes high and the switching circuit goes on.
Then C502 (8pF) is added to the TX VCO circuit and becomes the 43~44 MHz band oscillator.
(2) CH16~CH25: Pin 10 of IC1 becomes low, and the switching circuit goes off.
C502 is not added to the TX VCO circuit and becomes the 46 MHz band oscillator.

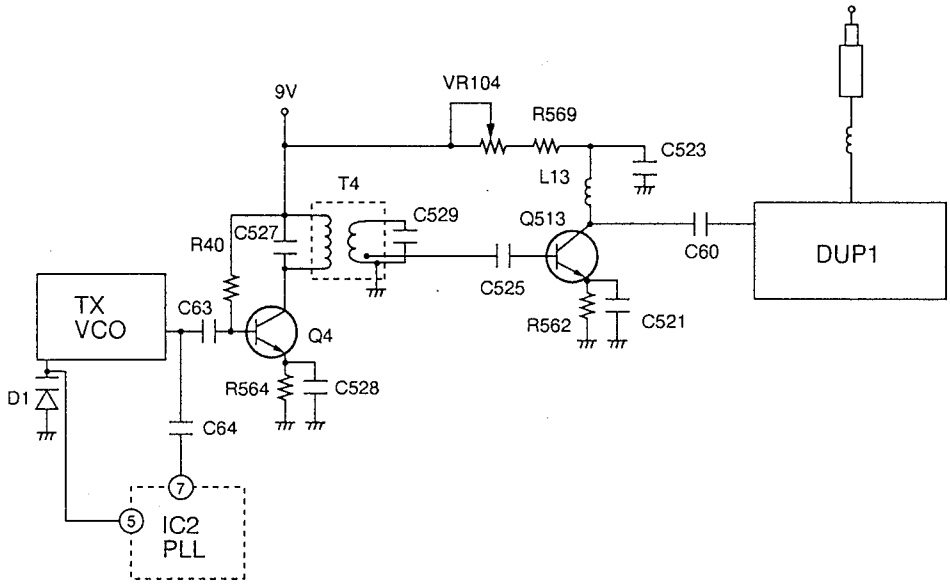
Circuit Diagram



■ TRANSMITTER OUTPUT AMP CIRCUIT

The signal which is oscillated at TX VCO, is amplified by buffer amp (Q4, T4, C527, C529) of 48~49 MHz band width.
It is amplified again by amplifier Q513 (L13 load). The gain of Q513 is adjusted by VR104. The signal passes through DUP1 and is radiated from the antenna.

Circuit Diagram



NORMAL CIRCUIT OPERATION (KX-TC150H-W)

■ TELEPHONE LINE INTERFACE

Circuit Operation:

•ON HOOK

Q9 is open, Q9 is connected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an on-hook condition.

• SPECIFICATIONS

In the on-hook state (idle), the current flows between the telephone line and the unit is as follows:

T → C126 → R130 → PC1 → R

The DC component is blocked by C126: thereby providing an on-hook condition.

The AC interface impedance is over 47 kΩ; thus, satisfying the telephone company requirements.

■ TELEPHONE MODE OPERATION

When a ring signal enters from the Line

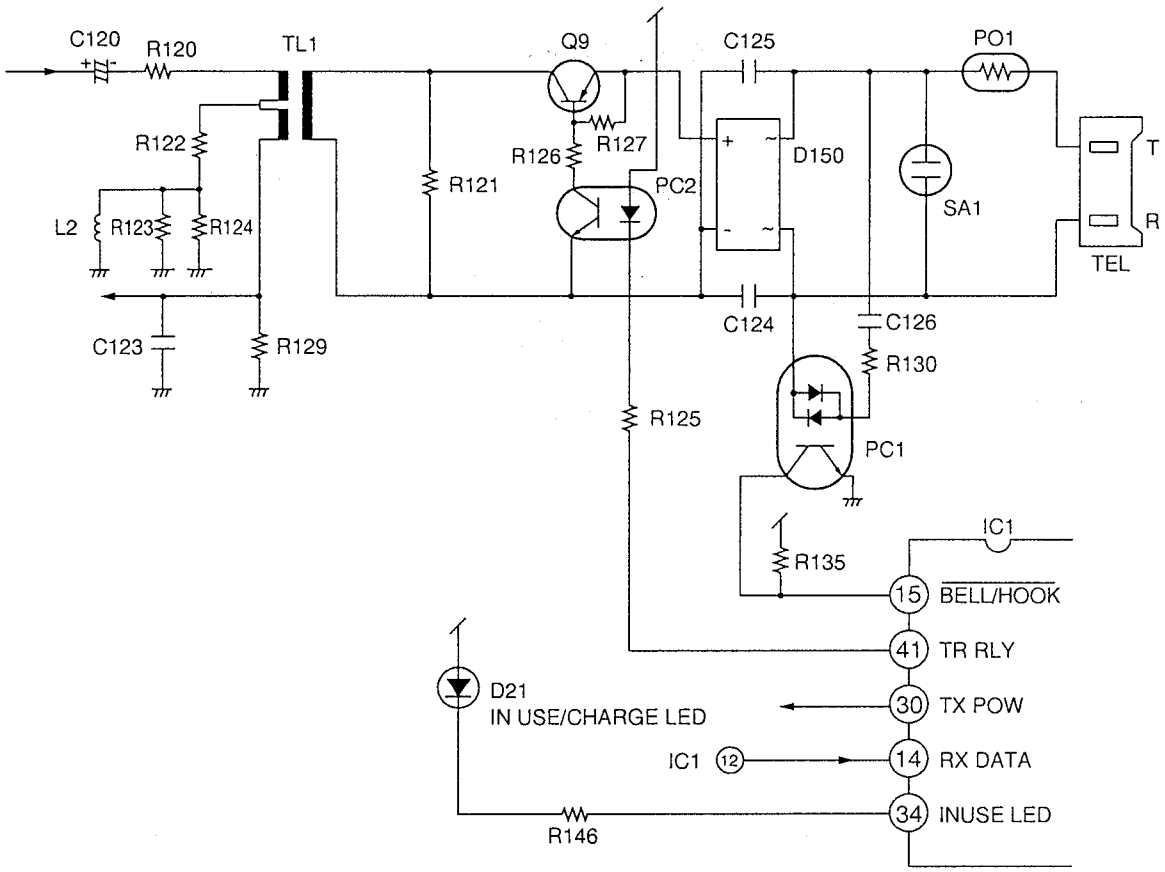
1) The ring detection circuit, i.e., the photocoupler PC1, begins to operate and its output is input to Pin15 of IC1 (CPU).
2) To show the arrival of the ring signal to the portable handset, Pin 30 of IC1 enters into the transmit mode thus becoming a High and the ring data having the code set by Pin 31 of IC1 is sent to portable handset as a modulated output signal.
3) Upon receiving the ring data, and the portable handset is switched from standby to the talk mode, the base unit receives a carrier modulated by the data indicating a switch from standby to talk.This data is then demodulated at the base unit and passes through a data signal amplifier of IC2, This signal is then inputted to Pin 14 of IC1, via Pin 41 of IC1 which causes Q9 and PC2 to release the muting, and enable talk.

Circuit-making from the portable handset

1) When the operator of the portable handset presses the talk button, data is transmitted the base unit , this data is then demodulated by the base unit and passed through data signal amplifier of IC2 and enters Pin 14 of IC1.
2) When the codes coincide, Pin 41 of IC2 becomes a "High". At this time the transmit condition is enabled and the photocoupler PC2 is turned on.
3) Further, and IN USE signal is sent out from Pin 34 of IC1, thus dimly lighting the IN USE/CHARGE LED (D21).

KX-TC150-W

Circuit Diagram

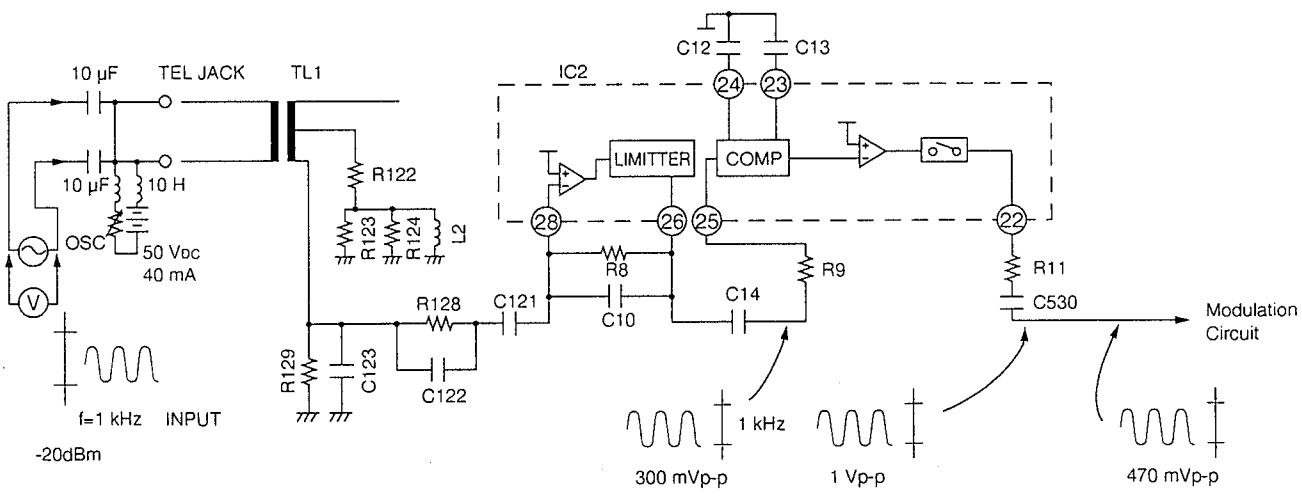


■ TRANSMITTER SIGNAL CIRCUIT

Circuit Operation:

1. The signal input from TEL LINE goes through tel line interface trans TL1 → C121, R128 and C122 → Pin 28 of IC2 Amp → LIMITTER, COMPRESSOR, and is output from Pin 22 of IC2.
2. The signal output from Pin 22 passes through C530 and R11, and is input to modulator circuit.

Circuit Diagram

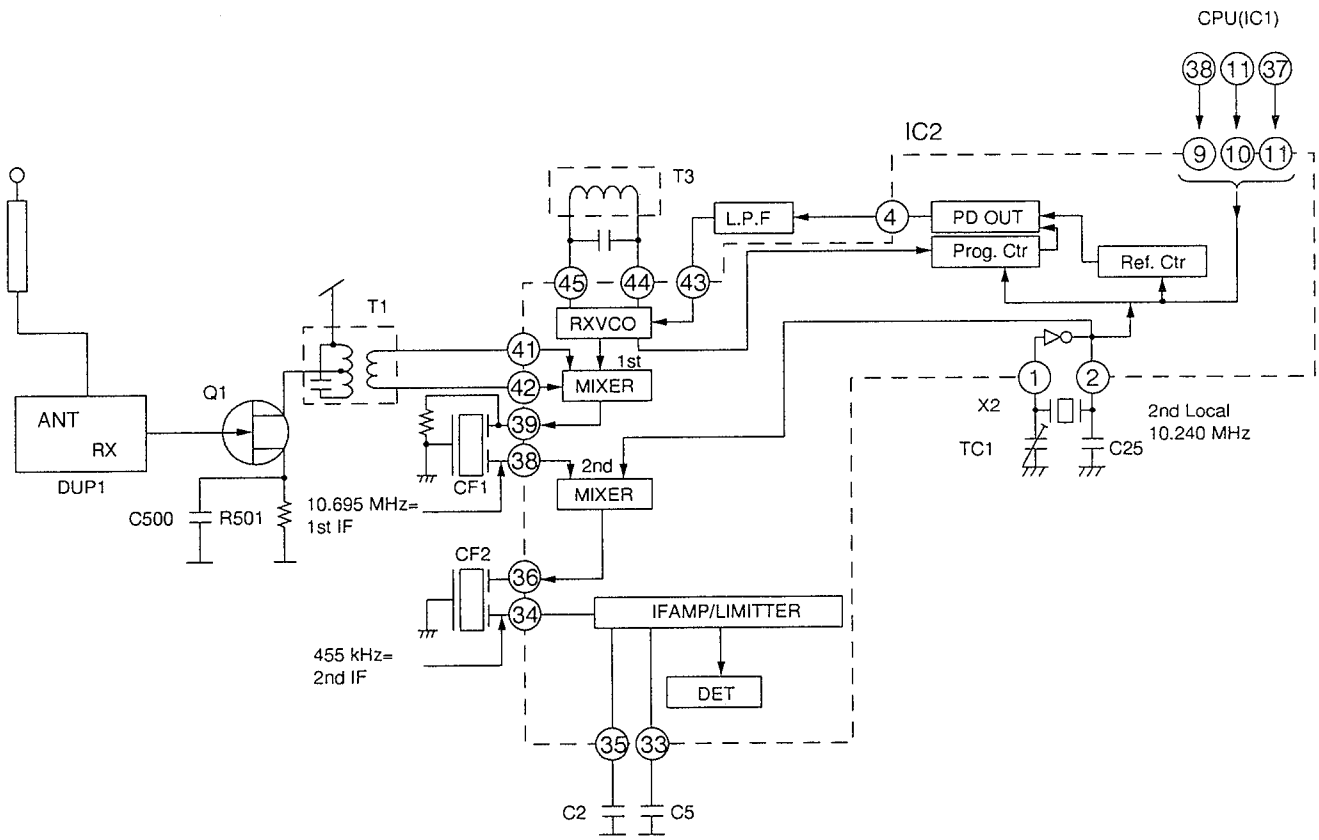


■ RECEIVER RF IF CIRCUIT

Circuit Operation:

The signal of 48~49 MHz band (48.76~49.99MHz) which is input from ANT is filtered at DUP1, passes through the filter AMP of 49 MHz band at T1 and Q1, and is input to Pins 41 and 42 of IC2.
RX VCO which oscillates at T3 and Pins 44, 45 of IC2 is input to program control at inside of IC2, 1st local frequency is controlled to assigned channel by serial data which is output, from Pins 11, 37 and 38 of IC1 (CPU), makes loop with Phase Detector Out and RX VCO, and locks 1st local frequency.
The input signal of Pin 41 of IC2 and 1st local frequency output from RX VCO are mixed at inside of IC2, then it passes through CF1, and 1st IF frequency of 10.695 MHz is generated. Farther, the 10.240 MHz and 10.695 MHz which are oscillated at X2 and Pins 1, 2 of IC2 are mixed at inside of IC2 and filtered at CF2, and 2nd IF 455 Hz is output.

Circuit Diagram

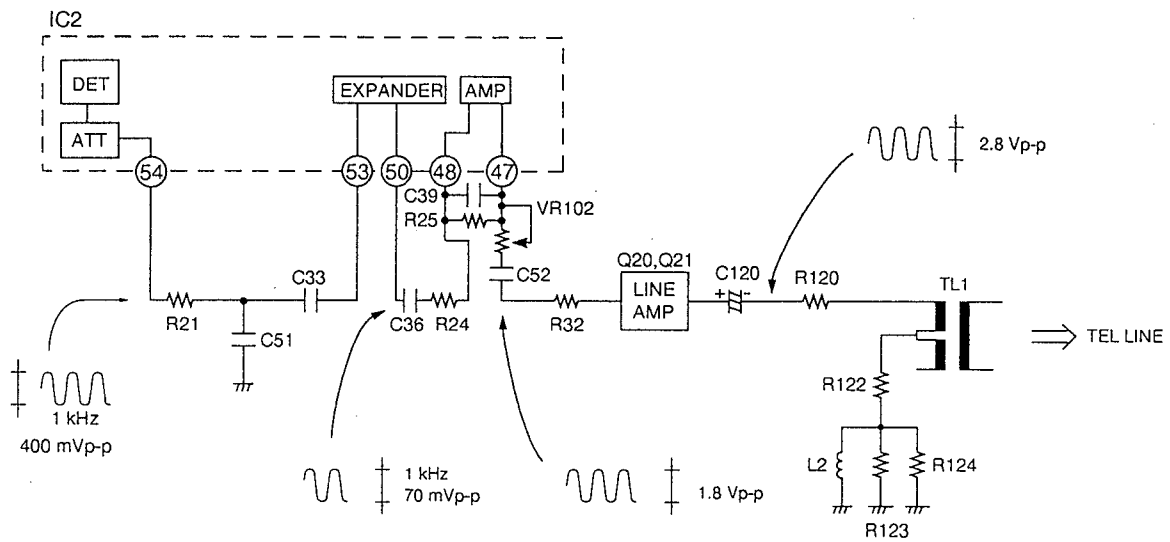


■ RECEIVER SIGNAL CIRCUIT

Circuit Operation:

1. The detected signal passes through R21, C33, is input to Pin 53 of IC2.
2. Then, it gpes through L.P.F. whith consists of Pin 53 of IC2 and external capacitor and resistor, and internal EXP/AMP of IC2 and is output from Pin 47 of IC2.
3. Then it goes through Butter Amp which consists of Q20, Q21 and tel line interface trans TL1, and is output to TEL LINE.

Circuit Diagram



Note: When applying the SSG input level of reception 60 dBμV
(3.0 kHz Deviation, f=1 kHz) from antenna, all waveform are measured.

■ INITIALIZATION CIRCUIT

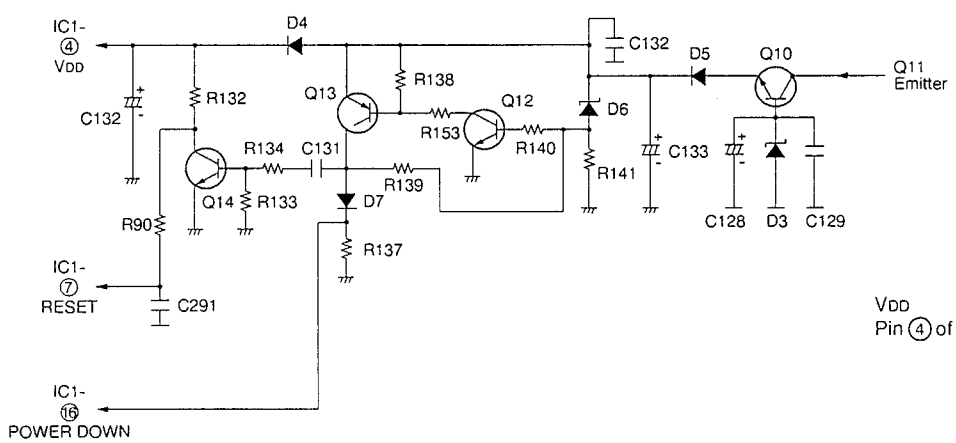
Function:

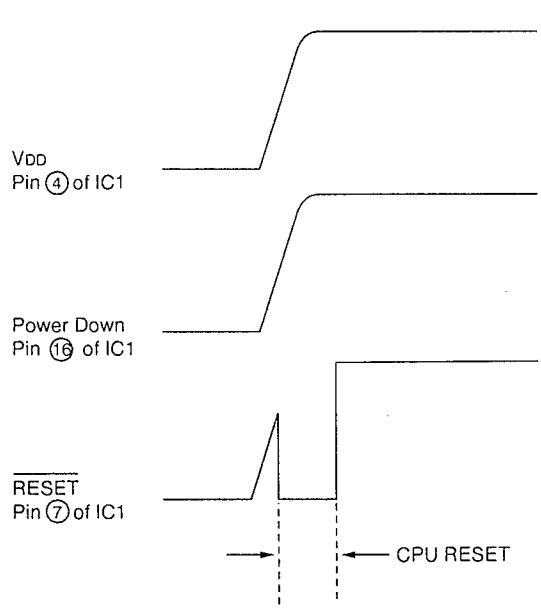
This circuit is used for initializing the CPU when the AC adaptor is connected.

Circuit Operation:

When the unit is switched ON, then the voltage is shifted by D5, D8 and power is supplied to the CPU.

Circuit Diagram





■ CHARGE DETECT CIRCUIT

Circuit Operation:

•CHARGE MODE

When charging the portable handset on the base unit, CH ID CODES are sent from the CONT terminal to the portable handset, and charging current is supplied to the portable handset from the battery charge contacts via R143, R155 on base unit:

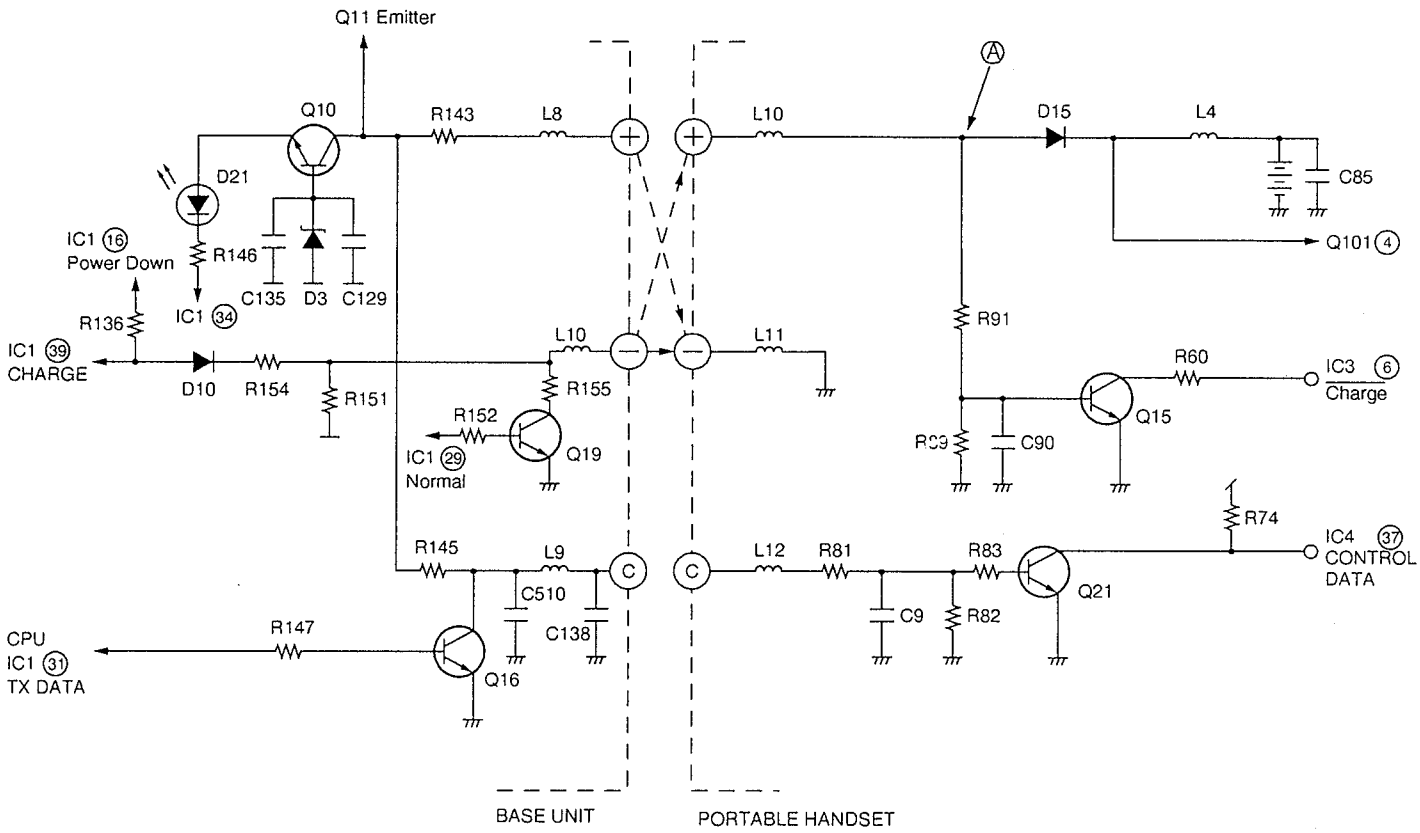
When ⊖ contact on base unit is input to Pin 39 of IC1 (CPU) through D10 and D21 (CHARGE LED) light is on. When the Ⓐ point on the portable handset is High level, Q15 on portable handset goes on and Pin 6 of IC3 becomes Low, and the pin1 of IC3 will become low, so pin 36 of IC4 (CPU) becomes low. In this way the CPU on portable handset detects the fact that the battery is charged.

•Set up of the portable handset

When charging the portable handset on the base unit, the data signal is sent from CONT terminal to portable handset. The Q16 switching is affected by Pin 31 of IC1 on base unit, the sending data are CH data, ID code, tone or pulse mode data etc. The data signal is sent to Pin 37 of IC4 (CPU) via Q21 on portable handset.

While charging these data continue to be sent, the CPU of portable handset operates independent of whether power switch is turned ON or OFF, and these data are received by the CPU.

Circuit Diagram

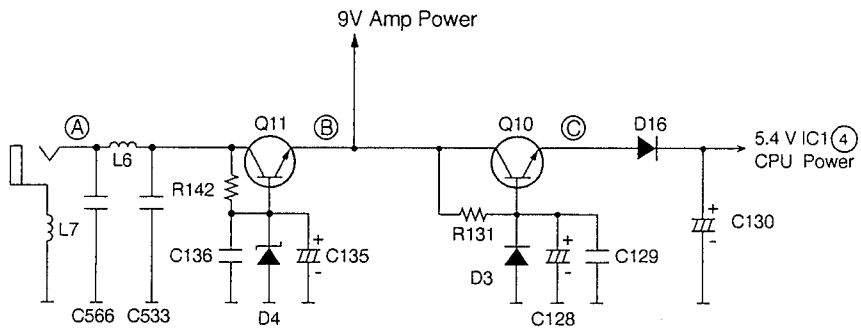


■ POWER SUPPLY CIRCUIT

Function:
Power from the AC adaptor passes through a 2-stage regulating block consisting of Q11 and Q10 and provides system voltages of 5.4 and 9 V.

Circuit Operation:
Power from the AC adaptor is supplied directly to the plunger. Q11 is a regulated power supply. The voltage at point Ⓑ is regulated to 9 V by the zener voltage of D4→Amp power. Q10 is a regulated power supply. The voltage at point Ⓒ is regulated to 6 V by the zener voltage of D3. The 6 V voltage is dropped by D16 to 5.4 V.

Circuit Diagram

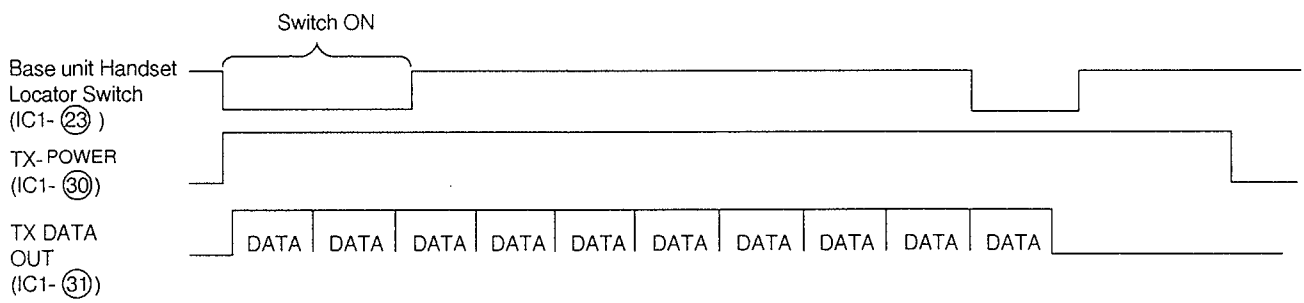


■ CPU OPERATION

1. TEL MODE

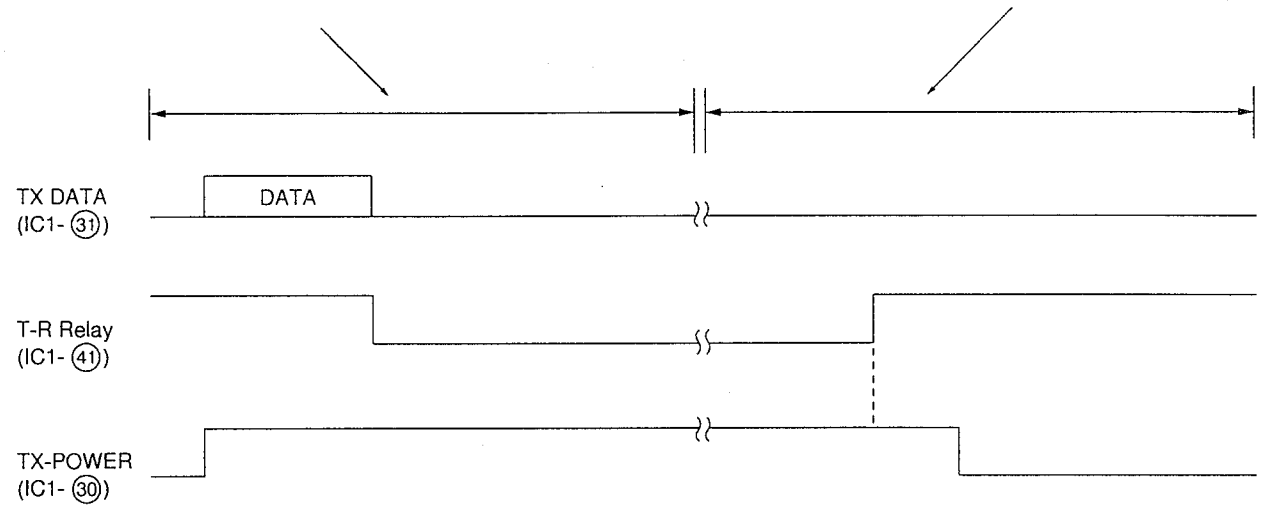
CPU Terminals / Operation Mode	30 TX POW	31 TX DATA	41 TR-RLY
STANDBY	L	L	H
TALK	H	L	L
150H-W→150R-W Ring	H	DATA	H
150H-W→150R-W Paging	H	DATA	H
CHARGE	L	DATA	H

2. TIMING OF IC1 (CPU) OUTPUT PORT WITH THE BASE UNIT IN HANDSET LOCATOR MODE



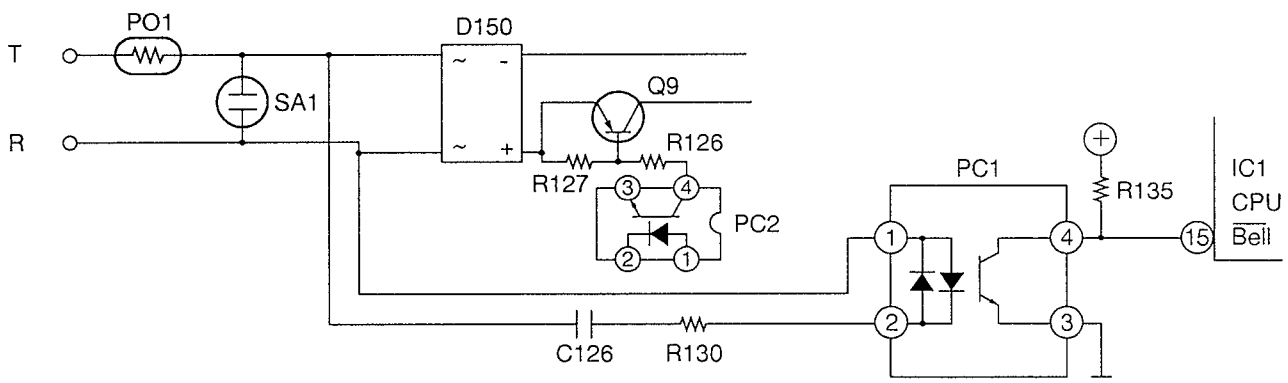
3. WHEN PRESSING THE TALK SWITCH OF THE PORTABLE HANDSET

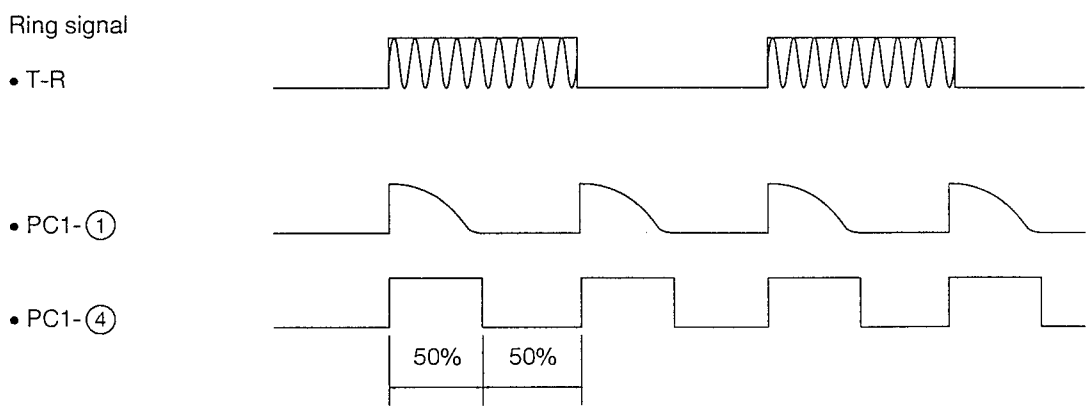
4. WHEN PRESSING THE TALK SWITCH OF THE PORTABLE HANDSET TO OFF



5. RESONANCE PREVENTION CIRCUIT

Circuit Diagram



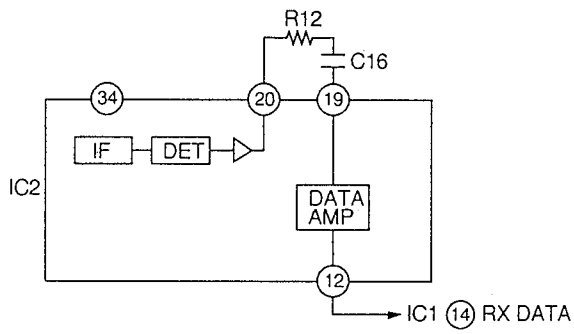


Make/break ratio when dialing with the Portable handset: 40%: 60%
High/low ratio upon ring signal: 50%: 50%
Therefore, if the low/high ratio is greater than 45% at IC1- 15 (CPU), it is judged as a ring signal.

6. EXPLANATION OF THE RECEIVE CIRCUIT

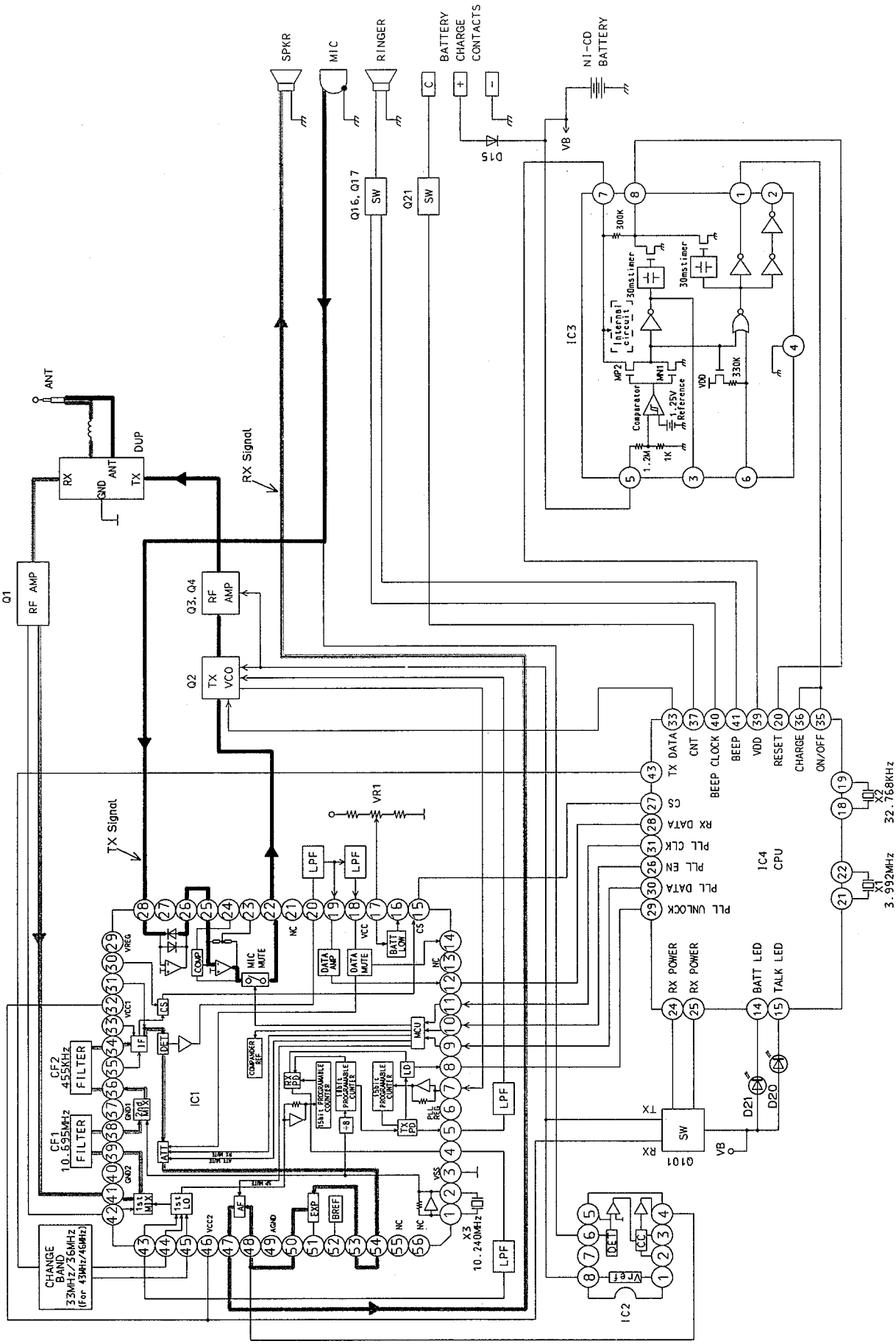
6-1. Signal Flow

Circuit Diagram



In area where the transmission power from the portable handset is extremely weak, noise is superimposed on the data and the chance of an error can become extremely great upon reception of the data. To help prevent this, the above circuit is used.

BLOCK DIAGRAM (KX-TC150R-W)



NEW CIRCUIT OPERATION (KX-TC150R-W)

■ RECEIVER RF IF CIRCUIT

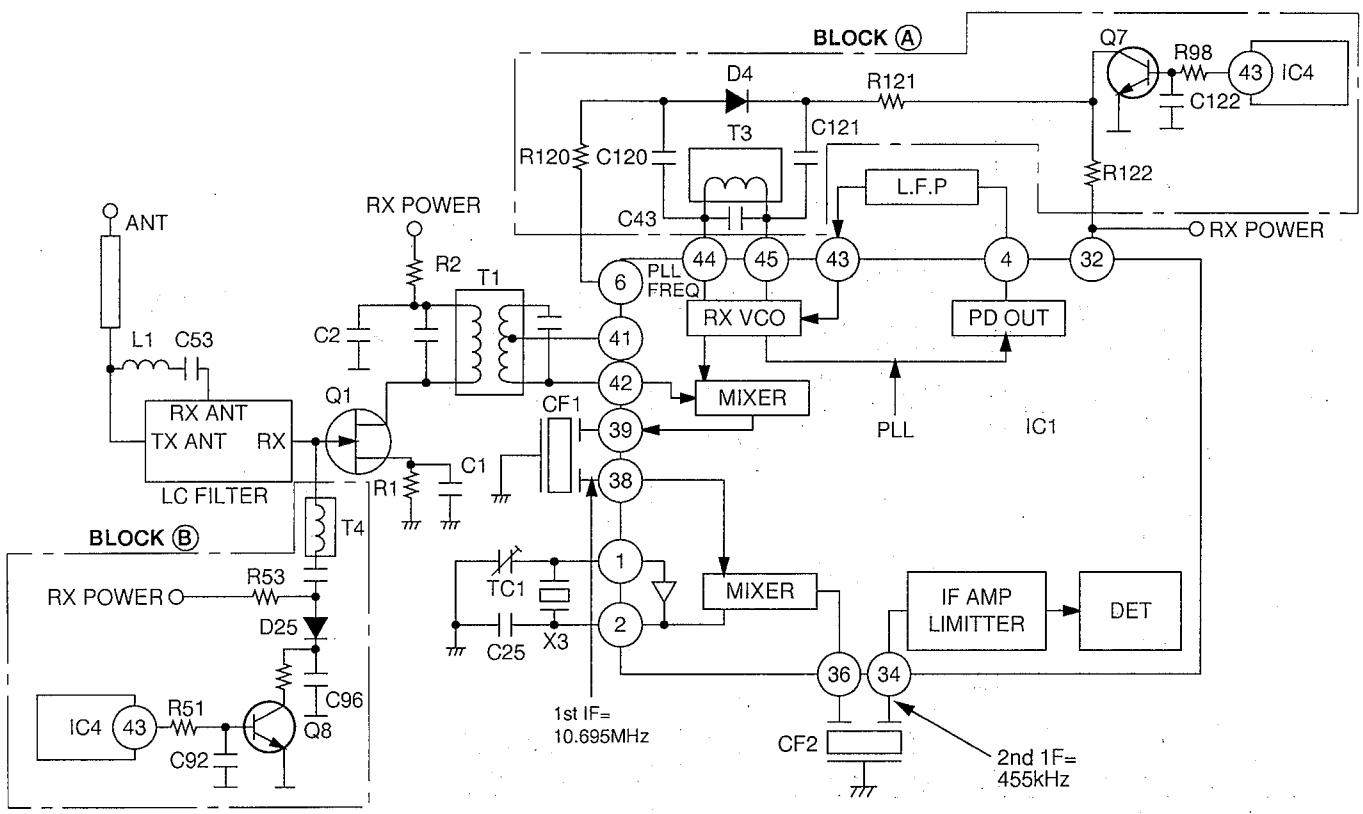
Circuit Operation:

The signal of 46 MHz band (46.61 MHz~46.97 MHz) which is input from ANT is filtered by DUP1, passes through filtered Amp of 46 MHz band at T1 and Q1, and is input to Pin 41 and Pin 42 of IC1.
The RX VCO which oscillates at T3 and IC1 is locked to 1st Local frequency by PLL inside IC1. (PLL is controlled by serial data output from Pin 26, 30 and 31 of IC4.)
An input signal from Pin 41 and 42 of IC1 and 1st Local frequency output from RX VCO are mixed inside IC1, pass through CF1, and 1st IF frequency of 10.695 MHz is generated.
Further, 10.240 MHz and 10.695 MHz oscillated at X3 pass through MIXER inside IC1 and are filtered at CF2 and output 2nd IF 455 kHz.

Block Ⓐ is the circuit for the RX VCO oscillator frequency selector (CH1~CH15, CH16~CH25).
(1) CH1~CH15: Pin 34 of IC4 becomes high and the frequency band width selector circuit turns on. D4 short-circuits, C120 (7PF) is added through C43 (27PF), and then it oscillates at a 33 MHz band width.
(2) CH16~CH25: Pin 34 of IC4 becomes low and the frequency band width selector circuit turns off. C120 is not added through C43 and it oscillates at a 36 MHz band width.

Block Ⓑ is the circuit for the RF band width selector.
(1) CH1~CH15: Pin 34 of IC4 becomes high and the selector circuit turns on. It is then connected to the LC circuit (T4, C124). The 48 MHz band width (CH1~CH15 TX frequency) is attenuated and passes through the 43~44 MHz band widths.
(2) CH16~CH25: Pin 34 of IC4 becomes low and the selector circuit turns off.
It then passes through the 46 MHz band width.

Circuit Diagram

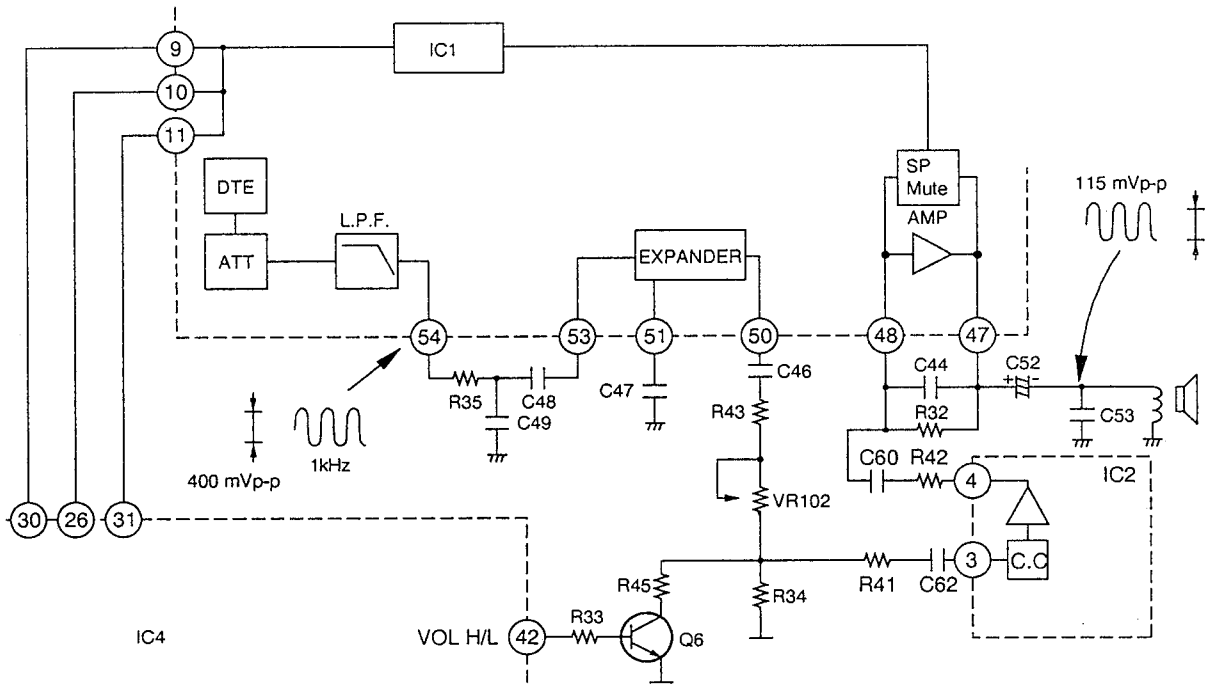


■ RECEIVER SIGNAL CIRCUIT

Circuit Operation:

1. ATT, RX MUTE, MIC MUTE, SP MUTE and PLL CONTROL (CH, REFERENCE, COUNTER) are all controlled by serial data output from Pins 26, 30 and 31 of IC4.
2. A detected signal passes through L.P.F. (fc=4 kHz) inside IC1 and is output to Pin 54.
3. Next, it is input to Pin 53 of IC1, passes through EXPANDER→SP AMP, and is output to speaker.

Circuit Diagram



Note: When applying the S.S.G. input level of reception 60 dBμV (3.0 kHz deviation, f=1 kHz) from the antenna, all wave form are measured.
Volum: High

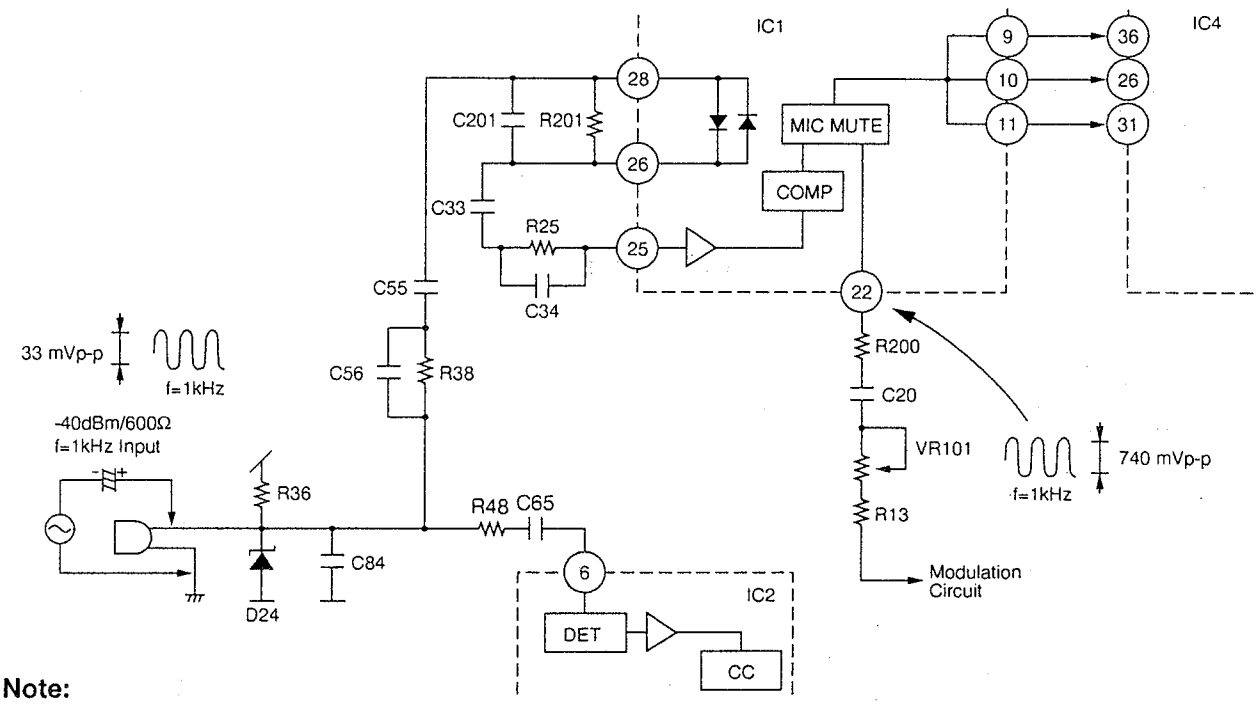
■ TRANSMITTER SIGNAL CIRCUIT

Circuit Operation:

1. Input signal from MIC is input to Pin 28 of IC1, passes through Limitter AMP and is output to Pin 26.
2. Next, it passes through C33 and R25 and is input to Pin 25 of IC1, then passes through COMPRESSOR and is output to Pin 22.
3. An output signal from Pin 22 passes through R200 and C20, VR101 and R13, and is input to modulator circuit.

KX-TC150-W

Circuit Diagram



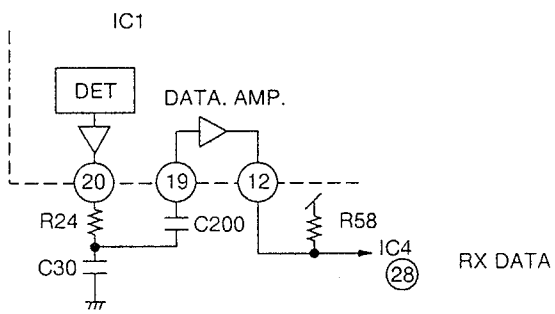
Note:
When measuring the waveform, apply the OSC Signal from microphone. (This value is signal level when input electrically from MIC, and if MIC operates soundly, Bias of DC voltage from R36 will be necessary.)

■ RECEIVER DATA CONTROL CIRCUIT

Circuit Operation:

The received signal that is output from Pin 20 of IC1 passes through a low pass filter and is input to Pin 19 of IC1 where the waveform is adjusted. The resulting signal is output from Pin 12 and input to Pin 28 of CPU.

Circuit Diagram



■ BATTERY DETECTOR CIRCUIT

Circuit Operation:

When the battery voltage goes down and the rest of operating time becomes short, the BATT Low/PROG indicator flashes or beeps intermittently.

NORMAL (KX-TC150R-W)

■ CPU OPERATION

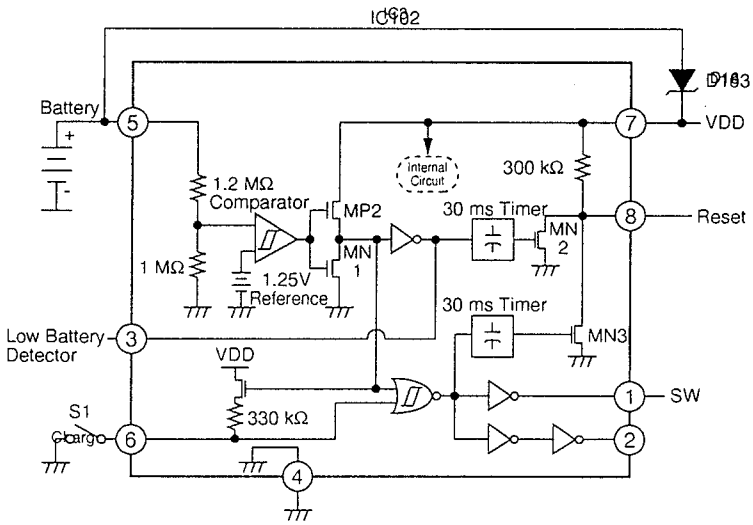
CPU Terminals / Operation Mode	23 TX DATA	25 RX POW	24 TX POW	41 BEEP	15 TALKLED
STANDBY	L	Intermittently H or L	H	H	H
TALK	L	L	L	H	L
150H-W→150R-W Ring	—	L	L	L	FLASHING
150H-W→150R-W Paging	—	L	L	L	H
CHARGE	L	H	H	H	H
During (TALK)	—	L	L	H	L
150R-W PULSE DIAL	DATA	L	L	H	FLASHING
150R-W TONE DIAL	DATA	L	L	H	L
150R-W OFF MODE	L	H	—	L	H

■ RESET CIRCUIT POWER ON/OFF CIRCUIT

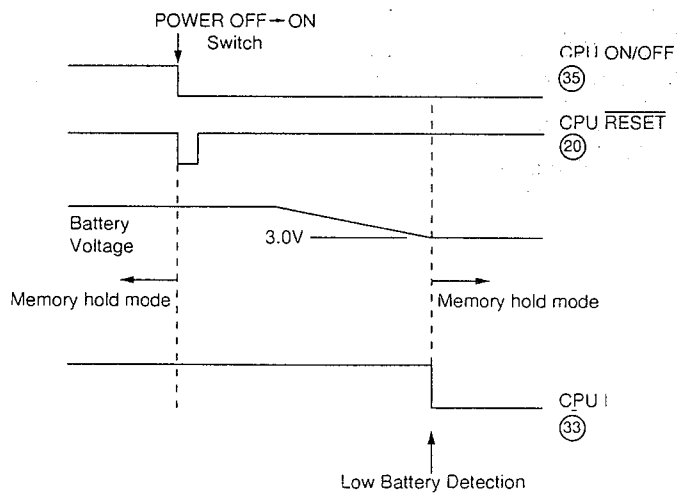
Reset circuit

The reset signal is input to Pin 20 of the CPU by the below circuit.
Once the reset signal is input, the CPU starts to operate from the memory hold mode.
(A) The reset signal will be output when voltage of battery is higher than 2.8 V.

Circuit Diagram



Timing Chart



KX-TC150-W

TROUBLESHOOTING GUIDE

Symptom	Refer to page –.	Unit for repair
The base unit does not respond to a call from portable handset.	11	Base Unit
The base unit does not transmit or the transmit frequency is off.		
The transmit frequency is off.		
The transmit power output is low, and the operating distance between base unit and portable handset is less than normal.		
The reception sensitivity of base unit is low with noise.		
The transmit level is large or small.		
The reception level is large or small.		
The unit does not link.		
The base unit does not ring from the speaker.	54	
The charge indicator does not light.	55	
The IN USE/Charge indicator does not flash.	55	
The beep is not heard from the portable handset.	55	
The movement of Battery Low indicator is wrong.	25	Portable Handset
The base unit does not respond to a call from portable handset. The base unit does not transmit or the transmit frequency is off.		
The transmit frequency is off.		
The transmit power output is low, and the operating distance between base unit and portable handset is less than normal.		
The reception sensitivity of base unit is low with noise.		
Does not link between base unit and portable handset.		
The reception level is large or small.		
The reception.		
After power switch is OFF, the portable handset does not become battery save mode.	56	
The beep is not heard from the portable handset.	57	
The TALK indicator does not flash.	57	

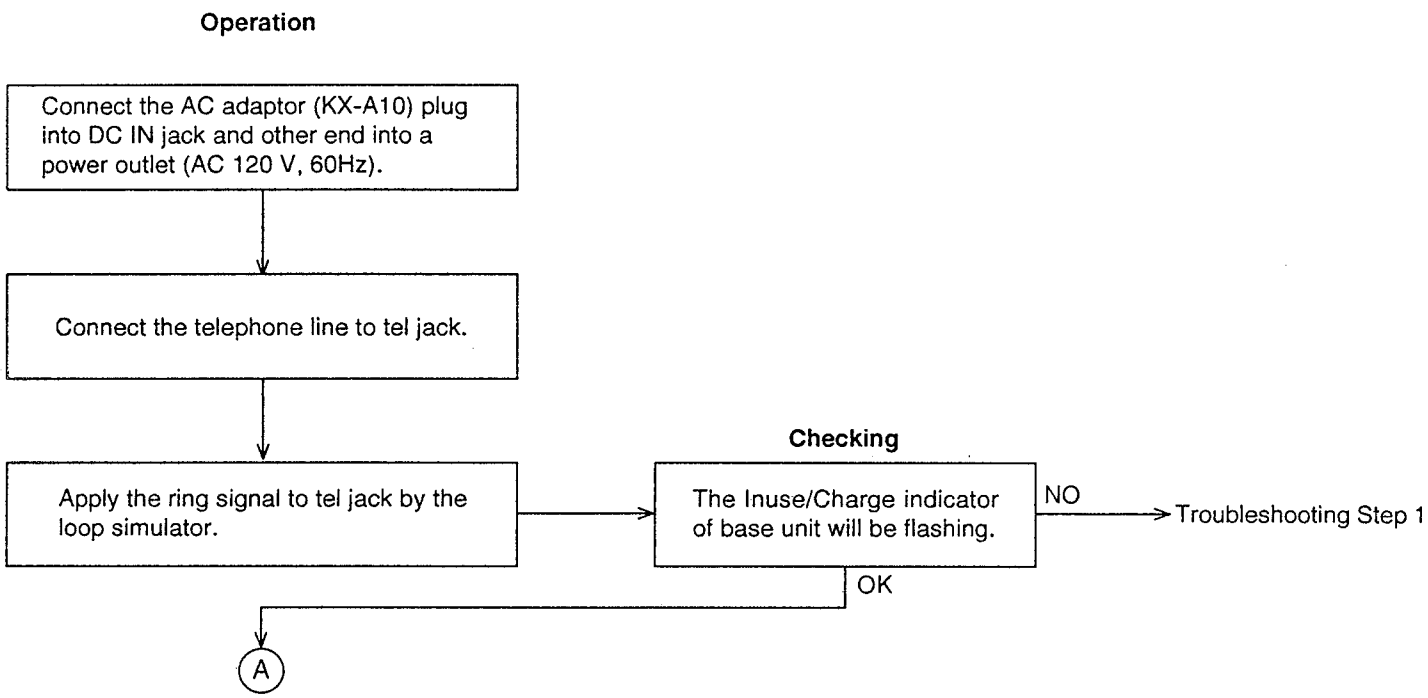
TROUBLESHOOTING GUIDE (KX-TC150H-W)

Base Unit Condition:

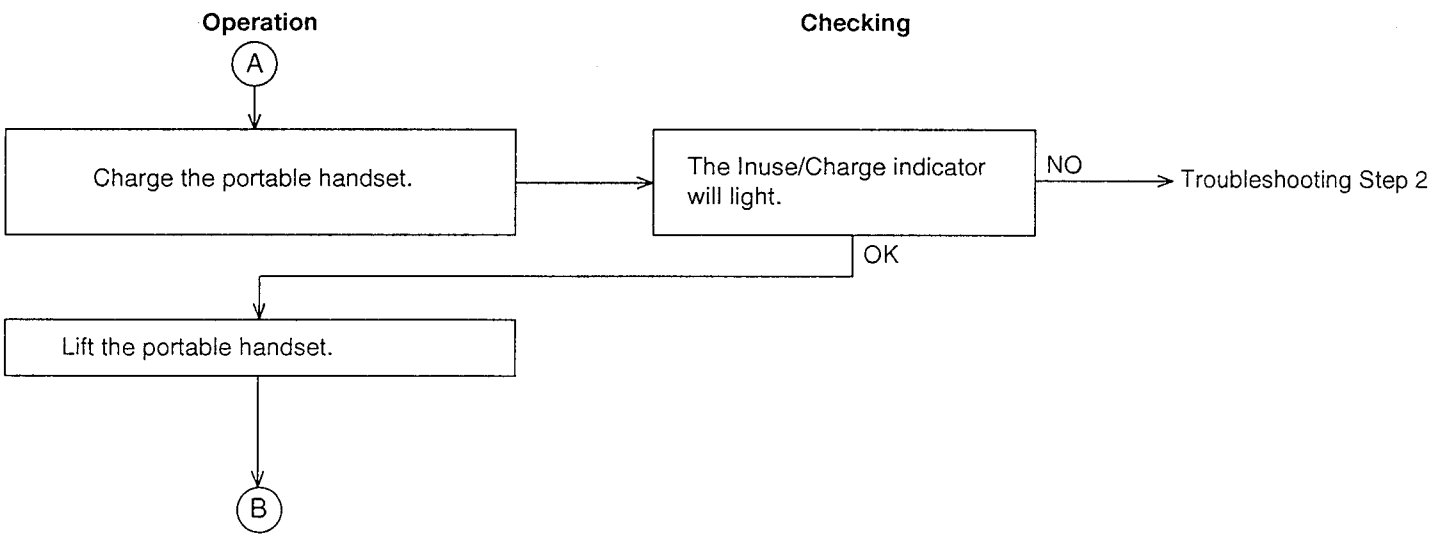
1. Set the Volume/Ringer button to "MAX".
2. Set the dialing mode selector to "Tone".

When checking the base unit only

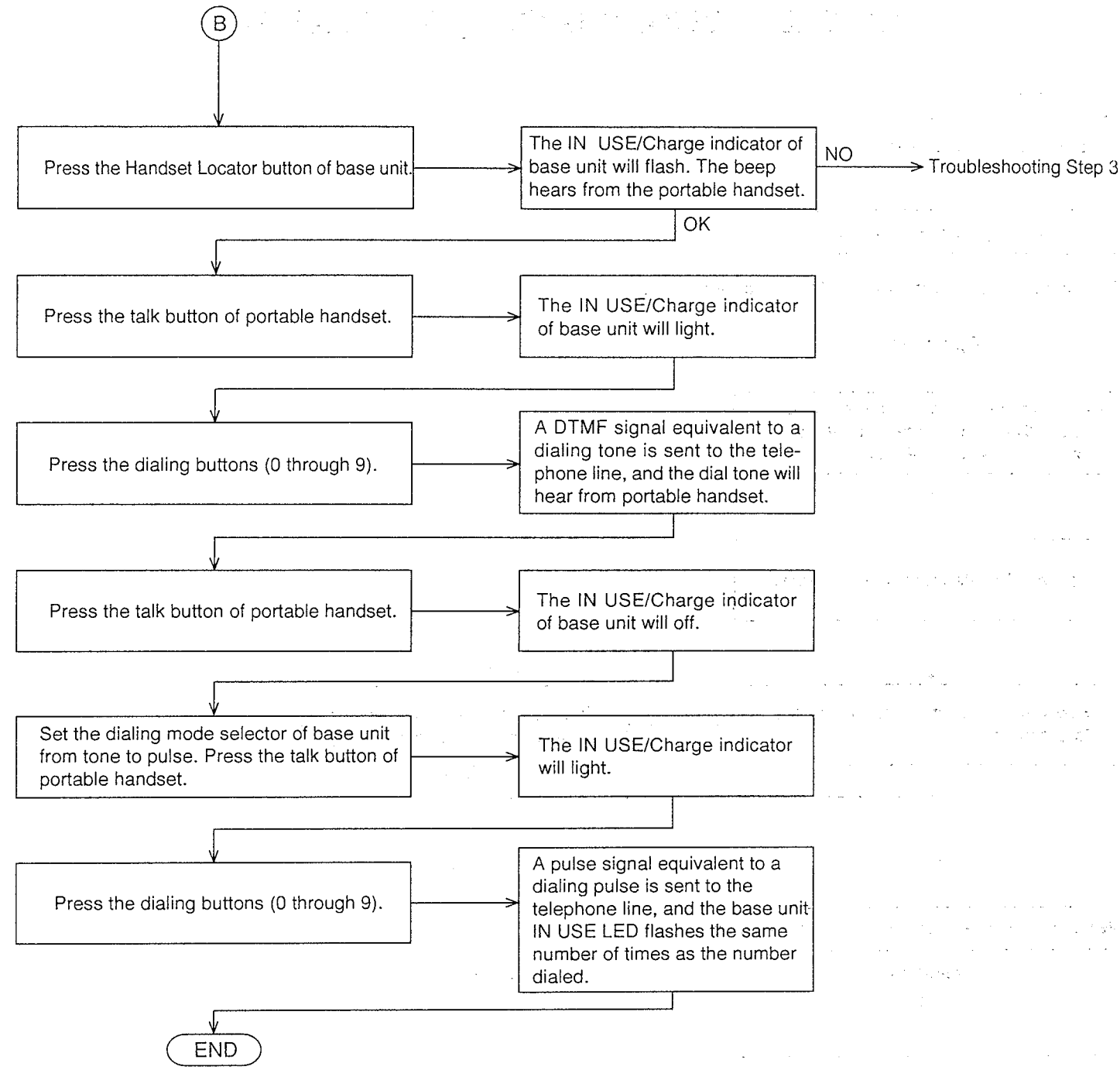
Check the base unit as shown by following below flow chart.



When checking the base unit and portable handset

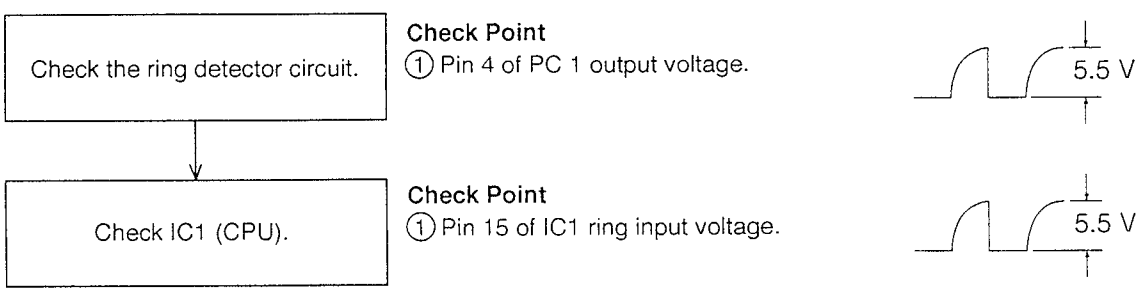


KX-TC150-W



Troubleshooting Step 1:

The base unit does not flash In Use/Charge indicator.



Troubleshooting Step 2: **The charge indicator does not light.**

Check the charge detector circuit.

↓

Check D21.

Check Point

① Is the ⊖ contact of base unit is low logic level?

Troubleshooting Step 3:

1) The INUSE/CHARGE indicator does not flash.

Check IC1(CPU).

↓

Check D21.

Check Point

1 Is the pin 34 of IC1 (INUSE/Charge output) at a low logic level?

2) The beep is not heard from the portable handset.

Check the data transmition during charge mode.

↓

Check the modulation circuit(D2).

↓

Check the oscillation circuit.

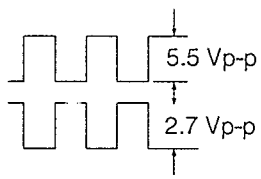
↓

Check the transmitter amplifier.

Check Points

① Pin 31 of IC 1 data output voltage.

② Collector of Q16 output voltage.



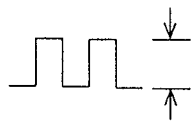
Check during charge mode

Check Point

① Is the base of Q5 (TX VCO) 4 V?

② Is the Pin 5 of IC2 3.2 V?

③ Are the Pins 11, 37 ,38 of IC1 (PLL control)?



Check Point

① Is the base of Q4 (Final power amplifier) 2 V?

KX-TC150-W

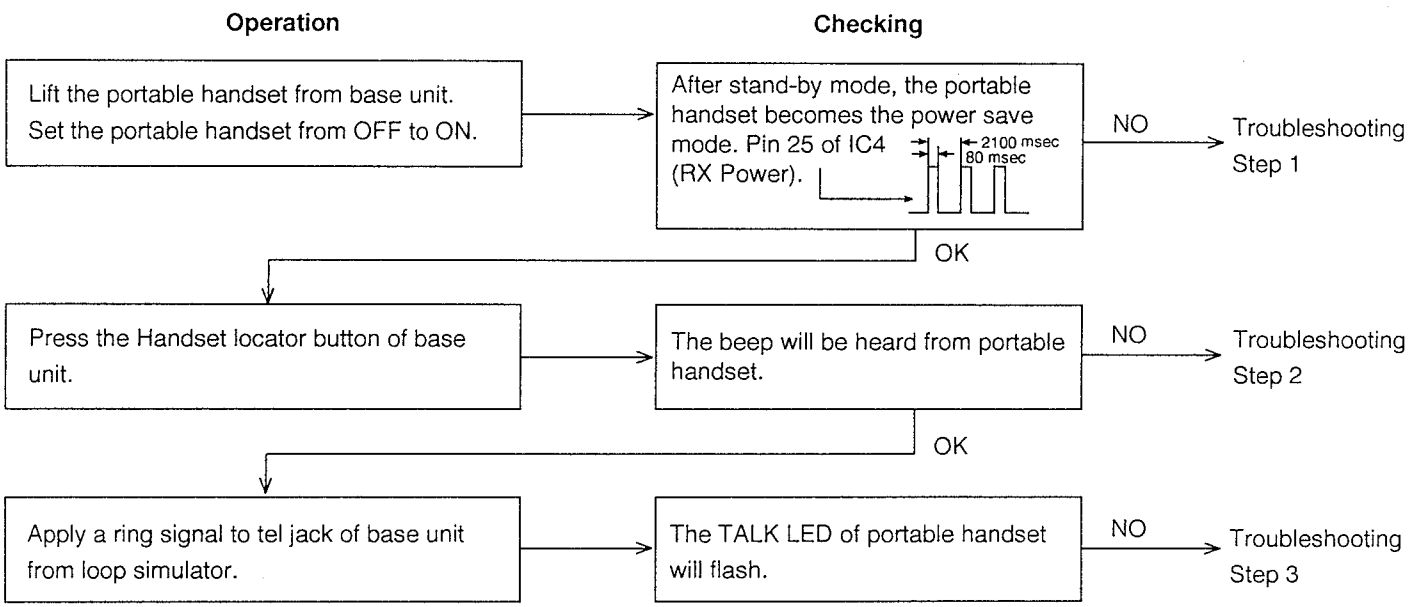
TROUBLESHOOTING GUIDE (KX-TC150R-W)

Use the right base unit for this troubleshooting.
Charge the battery of the portable handset by the base unit.

Base unit condition:

1. Connect the AC Adaptor (KX-A10) plug into DC IN jack and the other end into a power outlet (AC 120 V, 60Hz).
2. Connect the loop simulator (DC 48 V) to tel jack.

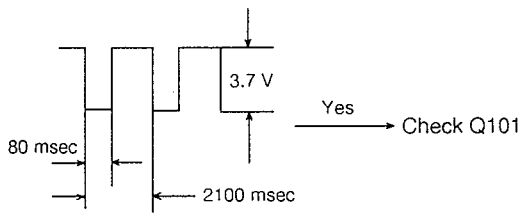
Check the portable handset as shown by following below flow chart.



Troubleshooting Step 1: **After stand-by mode, the portable handset does not becomes the battery save mode.**

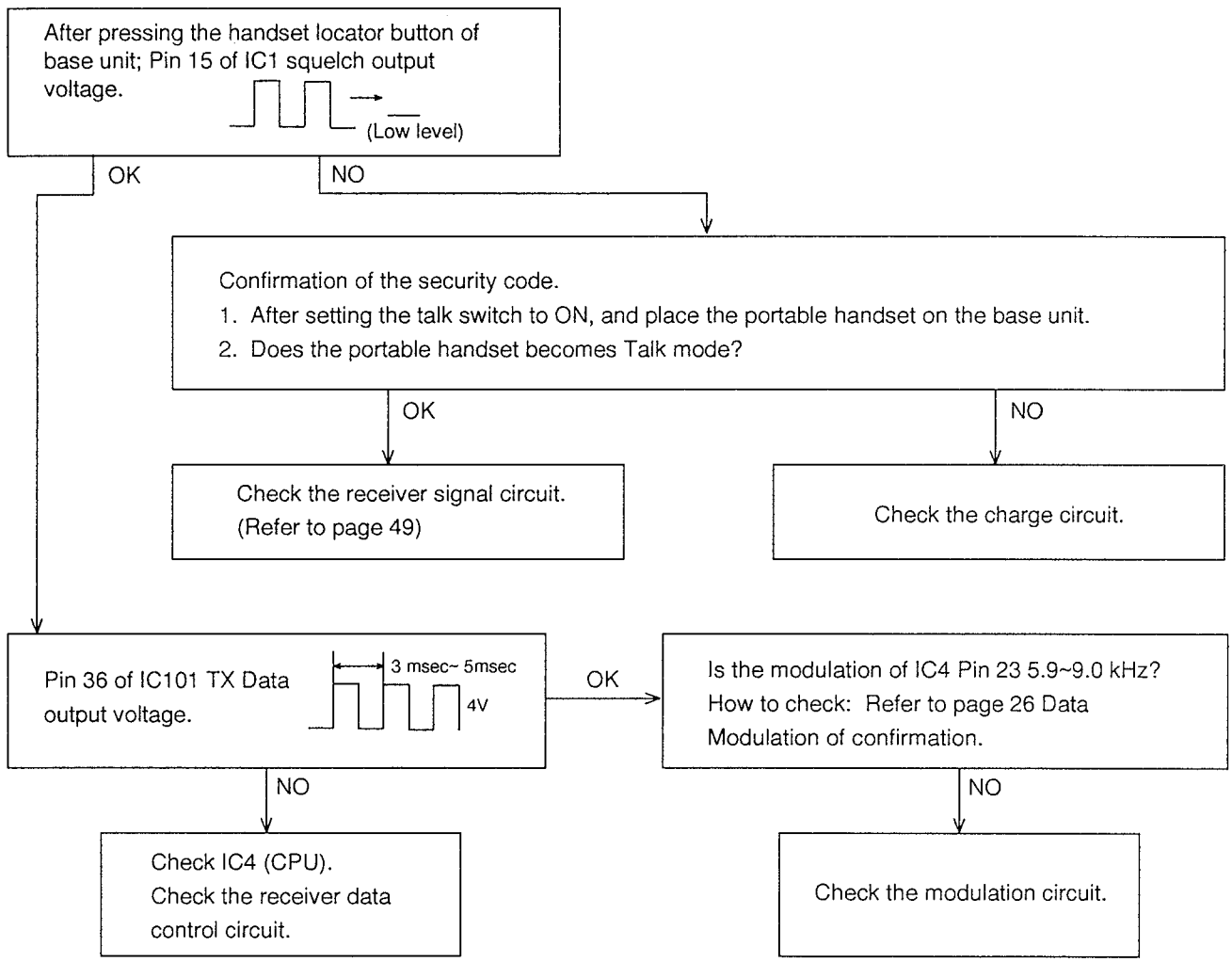
Check point

(1) Pin 25 of IC 4
RX power output voltage



Troubleshooting Step 2: **The beep is not heard from the portable handset.**

Check Points



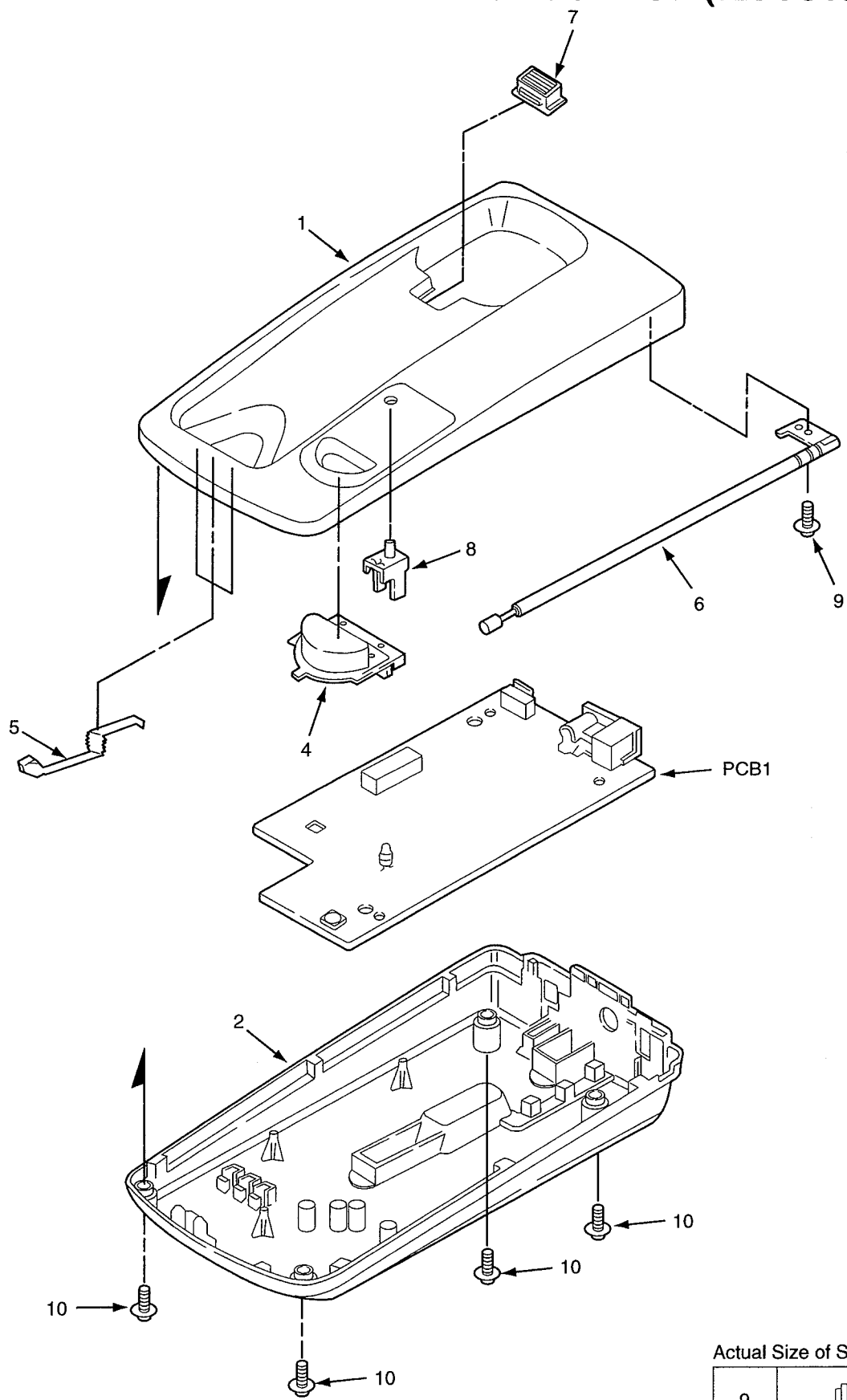
Troubleshooting Step 3: **The TALK indicator does not flash (Check the data reception).**

Check Point

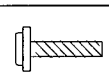
Check the signal level of receiver data control circuit on page 50.

KX-TC150-W

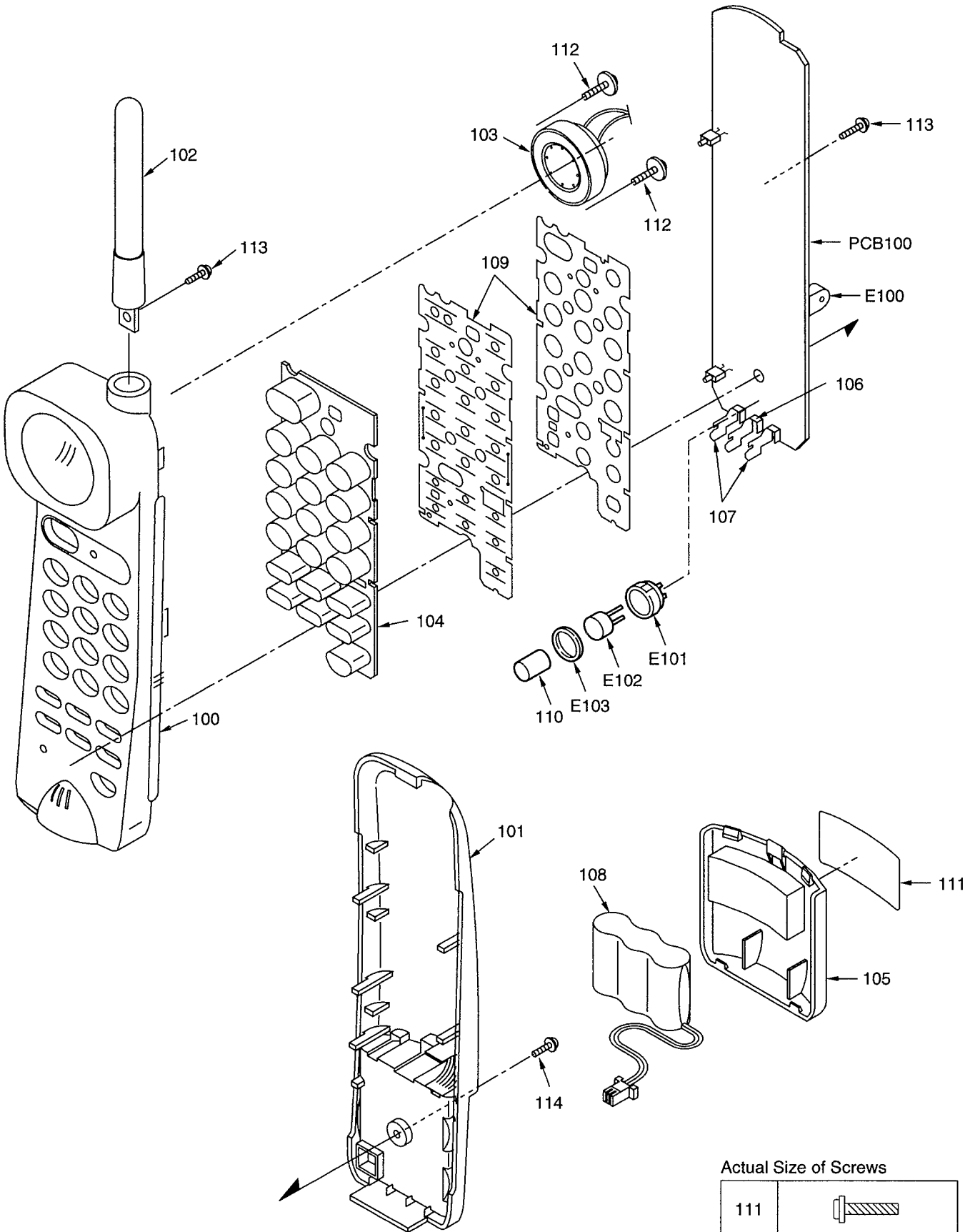
CABINET AND ELECTRICAL PARTS LOCATION (KX-TC150H-W)



Actual Size of Screws

9	
10	

CABINET AND ELECTRICAL PARTS LOCATION (KX-TC150R-W)

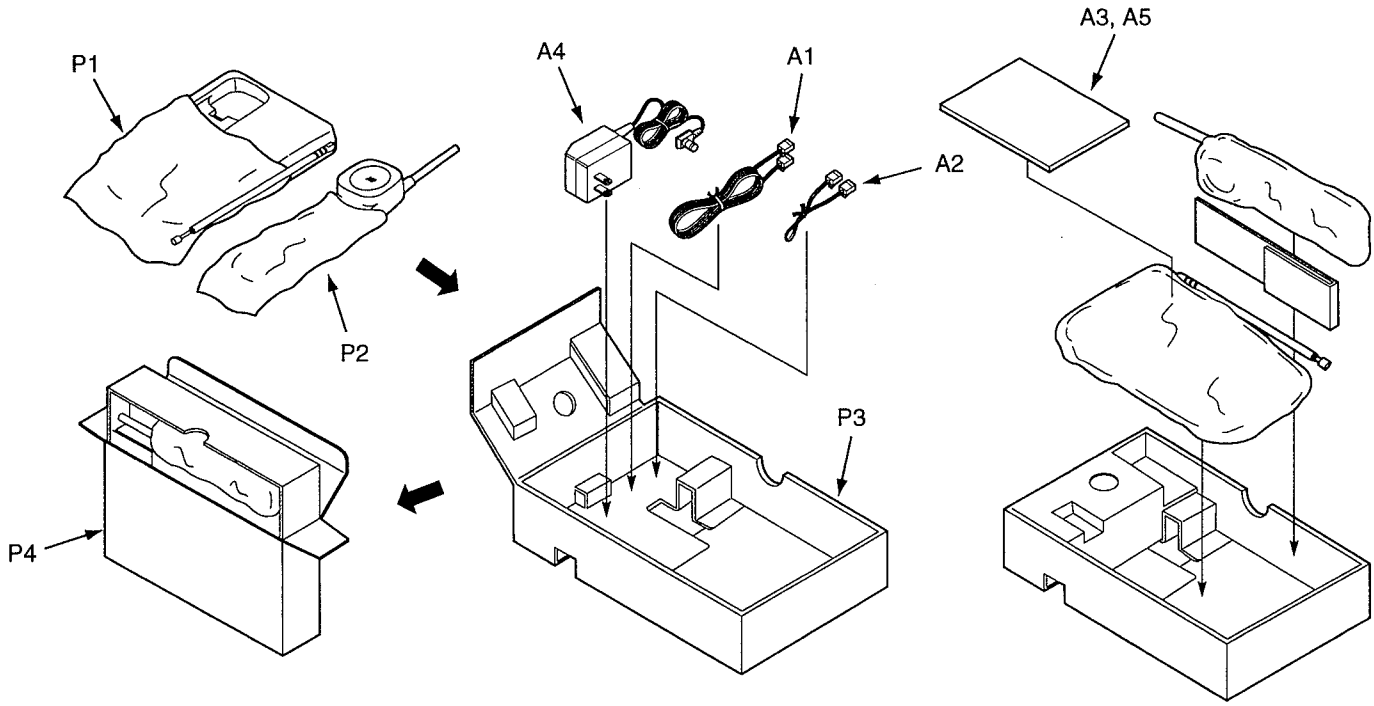


Actual Size of Screws

111	
112	

KX-TC150-W

ACCESSORIES AND PACKING MATERIALS



This replacement parts list is U. S. A. version only. Refer to the simplified manual (cover) for Canada or other aresa.

REPLACEMENT PARTS LIST

Model KX-TC150H-W

1. RTL (Retention Time Limited)

Note: The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.

2. Important safety notice
   Components identified by the ⚠ mark special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. The S mark indicates service standard parts and may differ from production parts.
4. RESISTORS & CAPACITORS
   Unless otherwise specified.
   All resistors are in ohms (Ω) K=1000Ω, M=1000KΩ
   All capacitors are in MICRO FARADS (μF) P=μμF
   *Type &Wattage of Resistor

Type

ERC:Solid	ERX:Metal Film	PQ4R:Carbon
ERD:Carbon	ERG:Metal Oxide	ERS:Fusible Resistor
PQRD:Carbon	ER0:Metal Film	ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor	ECCD,ECKD,ECBT,PQCBC : Ceramic
ECQS:Styrol	ECQE,ECQV,ECQG : Polyester
PQCUV:Chip	ECEA,ECSZ : Electrolytic
ECQMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H: 50V	05: 50V	0F:3.15V	0J :6.3V	1V :35V
2A:100V	1:100V	1A:10V	1A :10V	50,1H:50V
2E:250V	2:200V	1V:35V	1C :16V	1J :63V
2H:500V		0J:6.3V	1E,25:25V	2A :100V

Ref. No.	Part No.	Part Name & Description	Pcs/Set
		CABINET & ELECTRICAL PARTS	
1	PQKM10206R3	UPPER CABINET	1
2	PQKF10147M1	LOWER CABINET	1
3	PQHG316Z	RUBBER, FOOT	2
4	PQBC10191Z1	BUTTON, HANDSET LOCATOR S	1
5	PQJT10104Z	BATTERY TERMINAL	3
6	XEAPQK170D	ANTENNA	1
7	PQKE46Y21	HANGER S	1
8	PQHR10433Z	LED SPACER	1
9	XTW3+S10P	SCREW	1
10	XTW3+S14P	SCREW	4

Ref. No.	Part No.	Part Name & Description	Pcs/Set
		P.C.BOARD PARTS	
PCB1	PQWPTC100WH	P.C.BOARD ASS'Y (RTL)	1
		(ICS)	
IC1	MN150409KRG1	IC	1
IC2	AN6185NFA	IC	1
		(TRANSISTORS)	
Q1	2SK543	TRANSISTOR(SI)	1
Q2	2SD1819A	TRANSISTOR(SI)	1
		(or 2SC4081or 2SC4155)	
Q4	PQVTMSC2295C	TRANSISTOR(SI)	1
Q5	2SC2412K	TRANSISTOR(SI)	1
Q6	PQVTMSC2295C	TRANSISTOR(SI)	1
Q9	2SA1776P	TRANSISTOR(SI) ⚠ S	1
		(or 2SA1625 or 2SA1776Q)	
Q10	2SD1991A	TRANSISTOR(SI)	1
Q11	2SD2136	TRANSISTOR(SI)	1
Q12	2SD1819A	TRANSISTOR(SI)	1
		(or 2SC4081or 2SC4155)	
Q13	2SB709A	TRANSISTOR(SI) S	1
		(or 2SA1162G)	1
Q14	2SD601R	TRANSISTOR(SI) S	1
		(or 2SC2712GRTE85L)	
Q16	2SD1994A	TRANSISTOR(SI)	1
Q19	2SD1991A	TRANSISTOR(SI)	1
Q20	2SD601R	TRANSISTOR(SI) S	1
		(or 2SC2712GRTE85L)	
Q21	2SD601R	TRANSISTOR(SI) S	1
		(or 2SC2712GRTE85L)	
Q513	2SC2412K	TRANSISTOR(SI)	1
		(DIODES)	
D1	MA840ATAKU	DIODE(SI) (or MA840BTAKU)	1
		(or PQVD1SV145)	
D2	MA840ATAKU	DIODE(SI)	1
D3	MA4062	DIODE(SI)	1
D4	MA4100	DIODE(SI)	1
D5	1SS120	DIODE(SI) (or 1SS131) (or 1SS119	1
		(or 1SS133) (or MA165)	
D6	MA4047	DIODE(SI)	1
D7	1SS120	DIODE(SI) (or 1SS131) (or 1SS119	1
		(or 1SS133) (or MA165)	
D8	1SS120	DIODE(SI) (or 1SS131) (or 1SS	1
		(or 1SS133) (or MA165)	
D10	1SS120	DIODE(SI) (or 1SS131) (or 1SS	1
		(or 1SS133) (or MA165)	
D16	1SS120	DIODE(SI) (or 1SS131) (or 1SS	1
		(or 1SS133) (or MA165)	
D21	LN31GCPHV	LED	1
D150	PQVDS1ZB40F1	DIODE(SI) ⚠	1
D500	MA4051	DIODE(SI)	1
D501	1SS314	DIODE(SI)	1
		(COIL AND TRANSFORMAERS	
L1	PQLQZK1R0K	COIL	1
L2	PQLQZI104J	COIL	1
L5	PQLQZM1R2K	COIL	1
L6	PQLQZM1R2K	COIL	1
L7	PQLQZM1R2K	COIL	1

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Ref. No.	Part No.	Part Name & Description	Pcs/Set
L8	ELEPK330KA	COIL	1
L9	ELEPK330KA	COIL	1
L13	PQLQZMR33K	COIL	1
L14	PQLQZM1R2K	COIL	1
L17	PQLQZM330K	COIL	1
T1	PQLA7A34	COIL	1
T2	PQLI2B201	I.F. TRANSFORMER	1
T3	PQL04A1	COIL	1
T4	PQLA4Q1	COIL	1
T5	PQLA7A22	COIL	1
TL1	PQLT8F3A	TRANSFORMER ⚠	1
JP10	ELEPK330KA	COIL	1
		(VARIABLE RESISTORS)	
VR101	EVNDXAA03B25	VARIABLE RESISTOR	1
VR102	EVNDXAA03B15	VARIABLE RESISTOR	1
VR103	EVNDXAA03B15	VARIABLE RESISTOR	1
VR104	EVNDXAA03B13	VARIABLE RESISTOR	1
		(SWITCHES)	
S1	PQSS2A27W	SWITCH, DIALING MODE	1
S2	EVQQJJ05Q	SWITCH, HANDSET LOCATOR	1
		(CRYSTALS)	
X1	PQVCJ3573N9Z	CRYSTAL OSCILLATOR	1
X2	PQVCJ10240C5	CRYSTAL OSCILLATOR	1
		(PHOTO COUPLERS)	
PC1	PQVIPC814K	PHOTO ELECTRIC TRANSDUCER	1
PC2	PQVITLP627	PHOTO ELECTRIC TRANSDUCER	1
		(CERAMIC FILTERS)	
CF1	PQVFSFE107MJ	CERAMIC FILTER S	1
CF2	PQVFCFH455F1	CERAMIC FILTER	1
		(OTHERS)	
JJ1	PQJJ2HA1Z	JACK, TEL/DC IN	1
DUP1	PQVFDX25CHB	COIL	1
TC1	ECRLA030E53	TRIMMER CAPACITOR	1
PO1	PQRPAR390N	POSISTOR ⚠	1
SA1	PQVDRA311PT3	VARISTOR ⚠ S	1
		(RESISTORS)	
R0	PQ4R10XJ105	1M	1
R1	ERJ3GEYJ101	100	1
R3	ERJ3GEYJ683	68K	1
R4	ERJ3GEYJ124	120K	1
R6	ERJ3GEYJ103	10K	1
R8	ERJ3GEYJ154	150K	1
R9	ERJ3GEYJ333	33K	1
R11	ERJ3GEYJ472	4.7K	1
R12	ERJ3GEYJ562	5.6K	1
R13	ERJ3GEYJ472	4.7K	1
R14	ERJ3GEYJ104	100K	1

Ref. No.	Part No.	Part Name & Description	Pcs/Set
R15	ERJ3GEY0R00	0	1
R16	ERJ3GEYJ123	12K	1
R18	ERJ3GEYJ152	1.5K	1
R19	ERJ3GEYJ223	22K	1
R21	ERJ3GEYJ333	33K	1
R24	ERJ3GEYJ473	47K	1
R25	ERJ3GEYJ154	150K	1
R30	ERJ3GEYJ562	5.6K	1
R31	ERJ3GEYJ104	100K	1
R32	PQ4R18XJ103	10K	1
R33	ERJ3GEYJ564	560K	1
R34	ERJ3GEYJ101	100	1
R35	ERJ3GEYJ222	2.2K	1
R36	ERJ3GEYJ103	10K	1
R37	ERJ3GEYJ563	56K	1
R38	PQ4R10XJ561	560	1
R40	ERJ3GEYJ104	100K	1
R42	ERJ3GEYJ681	680	1
R43	ERJ3GEYJ104	100K	1
R44	ERJ3GEYJ223	22K	1
R45	ERJ3GEYJ223	22K	1
R46	ERJ3GEYJ683	68K	1
R47	ERJ3GEYJ683	68K	1
R48	ERJ3GEYJ104	100K	1
R49	ERJ3GEYJ682	6.8K	1
R50	ERJ3GEYJ222	2.2K	1
R51	ERJ3GEYJ103	10K	1
R52	ERJ3GEYJ473	47K	1
R53	ERJ3GEYJ683	68K	1
R54	ERJ3GEYJ103	10K	1
R55	ERJ3GEY0R00	0	1
R56	ERJ3GEYJ473	47K	1
R57	ERJ3GEYJ684	680K	1
R58	ERJ3GEYJ104	100K	1
R59	ERJ3GEYJ221	220	1
R62	ERJ3GEYJ470	47	1
R82	ERJ3GEYJ153	15K	1
R90	ERJ3GEYJ103	10K	1
R91	ERJ3GEYJ472	4.7K	1
R92	ERJ3GEYJ472	4.7K	1
R93	ERJ3GEYJ472	4.7K	1
R95	PQ4R18XJ101	100	1
R96	ERJ3GEYJ104	100K	1
R97	ERJ3GEYJ104	100K	1
R98	ERJ3GEYJ472	4.7K	1
R99	ERJ3GEYJ472	4.7K	1
R100	ERJ3GEYJ104	100K	1
R101	PQ4R10XJ101	100	1
R120	PQ4R10XJ100	10	1
R121	ERDS2TJ103	10K ⚠	1
R122	ERJ3GEY0R00	0	1
R123	ERJ3GEYJ222	2.2K	1
R124	ERJ3GEYJ271	270	1
R125	PQ4R10XJ472	4.7K ⚠	1
R126	ERDS2TJ122	1.2K ⚠	1
R127	ERDS2TJ104	100K ⚠	1
R128	ERJ3GEYJ183	18K	1

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Ref. No.	Part No.	Part Name, Description, & Value	Pcs/Set
R129	ERJ3GEYJ681	680	1
R130	ERDS2TJ473	47K ⚠	1
R131	ERJ3GEYJ102	1K	1
R132	ERJ3GEYJ104	100K	1
R133	ERJ3GEYJ104	100K	1
R134	ERJ3GEYJ104	100K	1
R135	ERJ3GEYJ123	12K	1
R136	ERJ3GEYJ104	100K	1
R137	ERJ3GEYJ104	100K	1
R138	ERJ3GEYJ104	100K	1
R139	ERJ3GEYJ823	82K	1
R140	ERJ3GEYJ103	10K	1
R141	ERJ3GEYJ103	10K	1
R142	PQ4R10XJ152	1.5K	1
R145	ERJ3GEYJ332	3.3K	1
R146	ERJ3GEYJ331	330	1
R147	ERJ3GEYJ473	47K	1
R151	ERDS2TJ471	470	1
R152	ERJ3GEYJ103	10K	1
R153	ERJ3GEYJ472	4.7K	1
R154	ERJ3GEYJ103	10K	1
R155	ERDS2TJ181	180	1
R300	ERJ3GEYJ332	3.3K	1
R501	ERJ3GEYJ221	220	1
R504	ERJ3GEYJ222	2.2K	1
R506	ERJ3GEYJ123	12K	1
R507	ERJ3GEYJ473	47K	1
R522	ERJ3GEYJ103	10K	1
R562	ERJ3GEYJ331	330	1
R564	ERJ3GEYJ471	470	1
R569	ERJ3GEYJ220	22	1
R571	ERJ3GEYJ220	22	1
R572	ERJ3GEYJ104	100K	1
R573	ERJ3GEYJ104	100K	1
R574	ERJ3GEYJ274	270K	1
R575	ERJ3GEYJ221	220	1
R576	ERJ3GEYJ223	22K	1
J51-53	ERJ3GEY0R00	0	3
J56-59	ERJ3GEY0R00	0	4
J62-66	ERJ3GEY0R00	0	5
J68-70	ERJ3GEY0R00	0	3
J73	ERJ3GEY0R00	0	1
J74	ERJ3GEY0R00	0	1
J82	ERJ3GEY0R00	0	1
J55	PQ4R10XJ000	0	1
J61	PQ4R10XJ000	0	1
J0	PQ4R18XJ000	0	1
J60	PQ4R18XJ000	0	1
J67	PQ4R18XJ000	0	1
J71	PQ4R18XJ000	0	1
J72	PQ4R18XJ000	0	1
J300	PQ4R18XJ000	0	1
J301	PQ4R18XJ000	0	1

Ref. No.	Part No.	Value		Pcs/Set
		(CAPACITORS)		
C1	ECUV1H103KBV	0.01	S	1
C2	PQCUV1H103KB	0.01	S	1
C3	ECUV1H104ZFV	0.1	S	1
C4	ECEA1CK101	100	S	1
C5	PQCUV1H682KB	0.0068	S	1
C6	ECEA1CKS100	10		1
C7	PQCUV1E473MD	0.047		1
C10	ECUV1H331JCV	330P		1
C12	PQCUV1C474ZF	0.47		1
C13	PQCUV1H105JC	1	S	1
C14	ECUV1H104ZFV	0.1	S	1
C16	PQCUV1E333MD	0.033		1
C17	PQCUV1H103KB	0.01		1
C19	PQCUV1E104MD	0.1	S	1
C20	PQCUV1C224ZF	0.22	S	1
C23	PQCUV1C474ZF	0.47		1
C24	ECEA1CKS100	10	S	1
C25	ECUV1H150JCV	15P		1
C26	ECUV1H223KBV	0.022		1
C27	ECEA1HKS3R3	3.3	S	1
C28	ECUV1H472KBV	0.0047	S	1
C33	ECUV1H104ZFV	0.1	S	1
C34	ECEA1CKS100	10	S	1
C35	PQCUV1C474ZF	0.47		1
C36	ECUV1H104ZFV	0.1	S	1
C39	ECUV1H101JCV	100P		1
C40	ECUV1H220JCV	22P		1
C51	ECUV1H562KBV	0.0056		1
C52	ECUV1H104ZFV	0.1	S	1
C53	ECUV1H151JCV	150P		1
C54	ECUV1H104ZFV	0.1	S	1
C60	ECUV1H101JCV	100P		1
C62	ECUV1H103KBV	0.01	S	1
C63	ECUV1H220JCV	22P		1
C64	ECUV1H220JCV	22P		1
C65	ECUV1H103KBV	0.01	S	1
C66	ECUV1H470JCV	47P		1
C67	ECUV1H680JCV	68P		1
C69	PQCUV1H105JC	1	S	1
C70	ECUV1H270JCV	27P		1
C71	ECUV1H390JCV	39P		1
C72	ECUV1H104ZFV	0.1	S	1
C73	PQCUV1H180JC	18P	S	1
C74	ECEA1HKS4R7	4.7	S	1
C75	ECUV1H3R0BCV	3		1
C76	ECUV1H681JCV	680P		1
C77	ECUV1H102KBV	0.001		1
C78	ECUV1H103KBV	0.01	S	1
C80	ECUV1H104ZFV	0.1	S	1
C83	ECUV1H102KBV	0.001		1
C84	ECUV1H151JCV	150P		1
C90	ECUV1H103KBV	0.01	S	1
C91	ECUV1H103KBV	0.01	S	1
C93	ECUV1H103KBV	0.01	S	1
C96	PQCUV1H103KB	0.01	S	1

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Ref. No.	Part No.	Value		Pcs/Set
C97	PQCUV1E104MD	0.1	S	1
C99	ECUV1H103KBV	0.01	S	1
C100	ECUV1H220JCV	22P		1
C101	ECUV1H220JCV	22P		1
C103	ECUV1H103KBV	0.01	S	1
C120	ECEA1EU470	47	S	1
C121	ERJ3GEY0R00	0		1
C122	ECUV1H562KBV	0.0056		1
C123	ECUV1H223KBV	0.022		1
C124	ECKD2H681KB	680P	⚠ S	1
C125	ECKD2H681KB	680P	⚠ S	1
C126	ECQE2224KF	0.22	⚠	1
C128	ECEA1AU101	100		1
C129	ECUV1H103KBV	0.01	S	1
C130	ECEA0JU102	1000		1
C131	PQCUV1C224ZF	0.22		1
C132	PQCUV1E104MD	0.1	S	1
C133	ECEA0JU102	1000		1
C134	ECEA1AU471	470		1
C135	ECEA1AU221	220		1
C136	PQCUV1H103KB	0.01	S	1
C138	PQCUV1H103KB	0.01	S	1
C290	ECUV1H103KBV	0.01	S	1
C291	ECUV1H104ZFV	0.1	S	1
C500	ECUV1H103KBV	0.01	S	1
C501	ECUV1H103KBV	0.01	S	1
C502	ECUV1H080DCV	8P		1
C503	ECUV1H103KBV	0.01	S	1
C506	ECUV1H104ZFV	0.1	S	1
C509	PQCUV1H103KB	0.01	S	1
C510	PQCUV1H103KB	0.01	S	1
C514	PQCUV1H103KB	0.01	S	1
C515	PQCUV1E104MD	0.1	S	1
C518	PQCUV1H103KB	0.01	S	1
C521	ECUV1H103KBV	0.01	S	1
C523	ECUV1H103KBV	0.01	S	1
C525	ECUV1H040CCV	4P		1
C527	ECUV1H560JCV	56P		1
C528	ECUV1H103KBV	0.01	S	1
C529	ECUV1H560JCV	56P		1
C530	PQCUV1E104MD	0.1	S	1
C533	ECUV1H103KBV	0.01	S	1
C534	ECUV1H103KBV	0.01	S	1
C566	ECUV1H103KB	0.01	S	1
J81	ECUV1H153KBV	0.015	S	1

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REPLACEMENT PARTS LIST

Model KX-TC150R-W

1. RTL (Retention Time Limited)

Note: The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability depends on the type of assembly and the laws govering parts and product retention. At the end of this period, the assembly will no longer be available.

2. Important safety notice
   Components identified by the ⚠ mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacturer's parts.
3. The S mark indicates service standard parts and may differ from production parts.
4. RESISTORS & CAPACITORS
   Unless otherwise specified;
   All resistors are in ohms (Ω) K=1000Ω, M=1000KΩ
   All capacitors are in MICRO FARADS (μF) P=μμF
   *Type & Wattage of Resistor
   Type

ERC:Solid	ERX:Metal Film	PQ4R:Carbon
ERD:Carbon	ERG:Metal Oxide	ERS:Fusible Resistor
PQRD:Carbon	ER0:Metal Film	ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage of Capacitor
Type

ECFD:Semi-Conductor	ECCD,ECKD,ECBT,PQCBC : Ceramic
ECQS:Styrol	ECQE,ECQV,ECQG : Polyester
PQCUV:Chip	ECEA,ECSZ : Electrolytic
ECQMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H: 50V	05: 50V	0F:3.15V	0J :6.3V	1V :35V
2A:100V	1:100V	1A:10V	1A :10V	50,1H:50V
2E:250V	2:200V	1V:35V	1C :16V	1J :63V
2H:500V		0J:6.3V	1E,25:25V	2A :100V

Ref. No.	Part No.	Part Name & Description	Pcs/Set
		CABINET & ELECTRICAL PARTS	
100	PQKM10205W1	FRONT CABINET	1
101	PQKF10180Z1	CABINET COVER	1
102	PQSA10041Z	ANTENNA	1
103	PQAX3P16Z	SPEAKER	1
104	PQSX10028W	SWITCH, KEYBOARD	1
105	PQKK10055Z1	BATTERY COVER	1
106	PQJT10101Z	BATTERY TERMINAL	1
107	PQJT10102Z	BATTERY TERMINAL	2
108	PQXA36ASVC	RECHARGEABLE BATTERY	1
109	PQSX10029Z	SHEET	1
110	PQHE10070Z	MIC SPONGE	1
111	PQQT11236Y	RECYCLE LABEL	1
112	PJHE5065Z	SCREW	2
113	XTW26+10E	SCREW S	2
114	XTW26+12F	SCREW	1

Ref. No.	Part No.	Part Name & Description	Pcs/Set
		P.C.BOARD PARTS	
PCB100	PQWPTC100WR	P.C.BOARD ASS'Y (RTL)	1
		(ICS)	
IC1	AN6185NFA	IC	1
IC2	AN6183SE1	IC S	1
IC3	PQVISC78184D	IC	1
IC4	PQVI0006G509	IC	1
		(TRANSISTORS)	
Q1	2SK543	TRANSISTOR(SI)	1
Q2	2SC2295	TRANSISTOR(SI) S	1
Q3	2SC2412K	TRANSISTOR(SI)	1
Q4	2SC2295	TRANSISTOR(SI) S	1
Q6	2SD1819A	TRANSISTOR(SI) (or 2SC4081or 2SC4155)	1
Q7	2SD1819A	TRANSISTOR(SI) (or 2SC4081or 2SC4155)	1
Q8	2SD1819A	TRANSISTOR(SI) (or 2SC4081or 2SC4155)	1
Q15	2SD1819A	TRANSISTOR(SI) (or 2SC4081or 2SC4155)	1
Q16	2SB709A	TRANSISTOR(SI) S (or 2SA1162G)	1
Q17	2SB709A	TRANSISTOR(SI) S (or 2SA1162G)	1
Q21	2SD1819A	TRANSISTOR(SI) (or 2SC4081or 2SC4155)	1
Q101	XN1116	TRANSISTOR(SI)	1
		(DIODES)	
D1	MA840BTAKU	DIODE(SI)	1
D3	PQVD1SV145	DIODE(SI) (or MA840BTAKU)	1
D4	1SS314	DIODE(SI)	1
D15	1SS120	DIODE(SI) (or ISS119) (or 1SS131) (or MA165)	1
D16	MA700A	DIODE(SI)	1
D17	MA4068	DIODE(SI)	1
D18	1SS120	DIODE(SI) (or ISS119) (or 1SS131) (or MA165)	1
D19	MA110	DIODE(SI)	1
D20	LNJ330GKGAC	LED	1
D21	LNJ230RKRAC	LED	1
D24	MA4068	DIODE(SI)	1
D25	1SS314	DIODE(SI)	1
D34	MA110	DIODE(SI)	1
		(VARIABLE RESISTORS)	
VR1	EVNDXAA03B15	VARIABLE RESISTOR	1
VR2	EVNDXAA03B35	VARIABLE RESISTOR	1
VR101	EVNDXAA03B55	VARIABLE RESISTOR	1
VR102	EVNDXAA03B54	VARIABLE RESISTOR	1
		(CRYSTAL OSCILLATORS)	
X1	PQVCJ3992N9Z	CRYSTAL OSCILLATOR	1
X2	PQVCL3276N9Z	CRYSTAL OSCILLATOR	1
X3	PQVCJ10240C5	CRYSTAL OSCILLATOR	1

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Ref. No.	Part No.	Part Name, Description, & Value	Pcs/Set
		(CERAMIC FILTERS)	
CF1	RVFSFE107MSR	CERAMIC FILTER S	1
CF2	PQVFCFH455F1	CERAMIC FILTER	1
		(COILS)	
L1	PQLQZK1R8J	COIL	1
L2	PQLQZM1R5K	COIL	1
L3	ELJFAR68M	COIL	1
L4	PQLQZM100K	COIL	1
L10	PQLQZM100K	COIL	1
L11	PQLQZM100K	COIL	1
L12	PQLQZM100K	COIL	1
T1	PQLA4Q2	COIL	1
T2	PQLI2B201	I.F. TRANSFORMER	1
T3	PQL04V1	COIL	1
T4	PQLA4M2	COIL	1
T11	PQLA7A7	COIL	1
T13	PQL07A8	COIL	1
		(OTHERS)	
CN1	PQJP2D13Z	CONNECTOR	1
DUP1	ELB4Z009	DUPLEX	1
TC1	ECRLA030E53	TRIMMER CAPACITOR	1
E100	PQEFBQM111G3	BUZZER	1
E101	PQHR10269Z	MIC HOLDER	1
E102	PQJM124X	MICROPHONE	1
E103	PQNW10002Z	WASHER	1
		(RESISTORS)	
R1	ERJ3GEYJ331	330	1
R2	ERJ3GEYJ220	22	1
R3	ERJ3GEYJ393	39K	1
R4	ERJ3GEYJ470	47	1
R5	ERJ3GEYJ470	47	1
R6	ERJ3GEYJ154	150K	1
R7	ERJ3GEYJ220	22	1
R8	ERJ3GEYJ220	22	1
R9	ERJ3GEYJ681	680	1
R10	ERJ3GEYJ223	22K	1
R11	ERJ3GEYJ223	22K	1
R12	ERJ3GEYJ472	4.7K	1
R13	ERJ3GEYJ473	47K	1
R14	ERJ3GEYJ823	82K	1
R15	ERJ3GEYJ104	100K	1
R16	ERJ3GEYJ224	220K	1
R17	ERJ3GEYJ822	8.2K	1
R18	ERJ3GEYJ473	47K	1
R19	ERJ3GEYJ272	2.7K	1
R20	ERJ3GEYJ333	33K	1
R23	ERJ3GEYJ561	560	1
R24	ERJ3GEYJ273	27K	1
R25	ERJ3GEYJ393	39K	1
R27	ERJ3GEYJ124	120K	1
R28	ERJ3GEYJ683	68K	1
R29	ERJ3GEYJ223	22K	1

Ref. No.	Part No.	Part Name & Description	Pcs/Set
R30	ERJ3GEYJ103	10K	1
R31	ERJ3GEYJ152	1.5K	1
R32	ERJ3GEYJ823	82K	1
R33	ERJ3GEYJ103	10K	1
R34	ERJ3GEYJ104	100K	1
R35	ERJ3GEYJ473	47K	1
R36	ERJ3GEYJ222	2.2K	1
R38	ERJ3GEYJ103	10K	1
R39	ERJ3GEYJ564	560K	1
R40	ERJ3GEYJ274	270K	1
R41	ERJ3GEYJ103	10K	1
R42	ERJ3GEYJ273	27K	1
R43	ERJ3GEYJ103	10K	1
R44	ERJ3GEYJ683	68K	1
R45	ERJ3GEYJ103	10K	1
R47	ERJ3GEYJ104	100K	1
R48	ERJ3GEYJ103	10K	1
R49	ERJ3GEYJ104	100K	1
R51	ERJ3GEYJ332	3.3K	1
R52	ERJ3GEYJ103	10K	1
R53	ERJ3GEYJ103	10K	1
R54	ERJ3GEYJ180	18	1
R55	ERJ3GEY0R00	0	1
R57	ERJ3GEYJ334	330K	1
R58	ERJ3GEYJ104	100K	1
R59	ERJ3GEYJ334	330K	1
R60	ERJ3GEYJ122	1.2K	1
R61	ERJ3GEYJ334	330K	1
R67	ERJ3GEYJ332	3.3K	1
R68	ERJ3GEYJ332	3.3K	1
R74	ERJ3GEYJ104	100K	1
R76	ERJ3GEYJ823	82K	1
R79	ERJ3GEYJ103	10K	1
R81	ERJ3GEYJ562	5.6K	1
R82	ERJ3GEYJ392	3.9K	1
R83	ERJ3GEYJ104	100K	1
R84	ERJ3GEYJ271	270	1
R85	ERJ3GEYJ120	12	1
R89	ERJ3GEYJ103	10K	1
R91	ERJ3GEYJ472	4.7K	1
R93	ERJ3GEYJ681	680	1
R94	ERJ3GEYJ681	680	1
R97	ERJ3GEYJ562	5.6K	1
R98	ERJ3GEYJ332	3.3K	1
R100	ERJ3GEYJ472	4.7K	1
R101	ERJ3GEYJ472	4.7K	1
R102	ERJ3GEYJ104	100K	1
R103	ERJ3GEYJ104	100K	1
R104	ERJ3GEYJ472	4.7K	1
R105	ERJ3GEYJ683	68K	1
R111	ERJ3GEYJ222	2.2K	1
R120	ERJ3GEYJ472	4.7K	1
R121	ERJ3GEYJ822	8.2K	1
R122	ERJ3GEYJ104	100K	1
R123	ERJ3GEY0R00	0	1
R200	ERJ3GEYJ394	390K	1
R201	ERJ3GEYJ224	220K	1

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Ref. No.	Part No.	Value		Pcs/Set
J1	ERJ3GEY0R00	0		
J2	ERJ3GEY0R00	0		
		(CAPACITORS)		
C1	ECUV1H103KBV	0.01	S	1
C2	ECUV1H104ZFV	0.1	S	1
C3	ECUV1H180JCV	18P		1
C4	ECUV1H471JCV	470P		1
C5	ECUV1H680JCV	68P		1
C6	ECUV1H220JCV	22P		1
C7	ECUV1H103KBV	0.01	S	1
C8	ECUV1H103KBV	0.01	S	1
C9	ECUV1H100DCV	10P		1
C10	ECUV1H220JCV	22P		1
C11	ECUV1H103KBV	0.01	S	1
C12	ECUV1H470JCV	47P		1
C13	ECUV1H680JCV	68P		1
C14	PQCUV1H330JC	33P	S	1
C15	ECUV1H271JCV	270P		1
C16	PQCUV1H120JC	12P	S	1
C17	ECUV1H3R0BCV	3P		1
C18	ECUV1H102KBV	0.001		1
C19	ECUV1H223KBV	0.022	S	1
C20	ECUV1H223KBV	0.022	S	1
C22	ECUV1H560JCV	56P		1
C24	ECST0JX336	33		1
C25	ECUV1H150JCV	15P		1
C26	PQCUV1C224ZF	0.22	S	1
C27	ECEA1CKS100	10		1
C30	ECUV1H104ZFV	0.1	S	1
C31	ECEA1CKS100	10		1
C32	ECEA1HKS2R2	2.2		1
C33	ECUV1H473MDV	0.047	S	1
C36	ECEA1CKS100	10		1
C37	ECUV1H473MDV	0.047	S	1
C38	ECUV1H103KBV	0.01		1
C39	ECUV1H103KBV	0.01		1
C40	ECUV1H472KBV	0.0047		1
C41	PQCUV1H105JC	1	S	1
C42	ECUV1H103KBV	0.01		1
C43	ECUV1H270JCV	27P		1
C44	ECUV1H272KBV	0.0027		1
C45	ECEA1CKS100	10		1
C46	PQCUV1E104MD	0.1	S	1
C47	PQCUV1C474ZF	0.47		1
C48	ECUV1H104ZFV	0.1	S	1
C49	ECUV1H472KBV	0.0047		1
C52	ECEA0JKS470	47		1
C53	ECUV1H070CCV	7P		1
C55	ECUV1H103KBV	0.01		1
C56	ECUV1H102KBV	0.001		1
C57	ECEA0JKS470	47		1
C58	ECUV1H103KBV	0.01	S	1
C59	ECUV1H103KBV	0.01	S	1

Ref. No.	Part No.	Value		Pcs/Set
C60	ECUV1H104ZFV	0.1	S	1
C61	ECST0GX476	47		1
C62	ECUV1H104ZFV	0.1	S	1
C64	PQCUV1H105JC	1	S	1
C65	ECUV1H104ZFV	0.1	S	1
C66	PQCUV1H105JC	1	S	1
C70	ECUV1C104KBV	0.1		1
C71	ECUV1H470JCV	47P		1
C72	ECUV1H470JCV	47P		1
C73	ECUV1H270JCV	27P		1
C74	ECUV1H270JCV	27P		1
C75	ECUV1H104ZFV	0.1	S	1
C76	ECUV1H104ZFV	0.1	S	1
C80	ECEA0GKS221	220		1
C81	ECUV1H104ZFV	0.1	S	1
C84	ECUV1H103KBV	0.01	S	1
C85	ECUV1H103KBV	0.01	S	1
C90	ECUV1H103KBV	0.01	S	1
C91	ECUV1H103KBV	0.01	S	1
C92	ECUV1H103KBV	0.01		1
C95	ECUV1H103KBV	0.01	S	1
C96	ECUV1H103KBV	0.01		1
C98	ECUV1H680GCV	68P		1
C99	ECUV1H100DCV	10P		1
C120	ECUV1H070CCV	7P		1
C121	ECUV1H562KBV	0.0056		1
C122	ECUV1H103KBV	0.01		1
C123	ECUV1H620GCV	62P		1
C124	ECUV1H2R0BCV	2P		1
C130	ECUV1H3R0BCV	3P		1
C200	ECUV1H104ZFV	0.1	S	1
C201	ECUV1H101JCV	100P		1

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Ref. No.	Part No.	Part Name & Description	Pcs/Set
		ACCESSORIES AND PACKING MATERIALS	
A1	PQJA59V	TEL CORD (LONG)	1
A2	PQJA59X	TEL CORD (SHORT)	1
A3	PQQX11648Z	INSTRUCTION BOOK	1
A4	KX-A10	AC ADAPTOR ⚠	1
A5	PQQT11156Y	TEL CARD LABEL	1
P1	PQPP10072Z	PROTECTION COVER	1
P2	PQPH89Y	PROTECTION COVER	1
P3	PQPN10496Z	CUSHION	1
P4	PQPK12165Z	GIFT BOX	1

H (Q)
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